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Redescription of *Rhopalurus abudi* (Scorpiones, Buthidae), with first description of the male and first record from mainland Hispaniola

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Abstract. *Rhopalurus abudi* Armas & Marcano Fondeur 1987 was originally described on the basis of a single female specimen from Isla Saona, La Romana Province, off the southeast coast of the Dominican Republic. The species is redescribed here based on a series of new specimens including 19 adult males and 14 adult females collected at two nearby localities on the eastern side of Parque Nacional del Este, La Altagracia Province, southeastern Dominican Republic. These specimens represent the first records of *R. abudi* on mainland Hispaniola and the first male specimens of the species to be collected.

Keywords: Alacran, Caribbean, Dominican Republic, Parque Nacional del Este, taxonomy, biogeography

The buthid scorpion genus *Rhopalurus* Thorell 1876 comprises 18 species and three subspecies (one nominotypical) of relatively large, lapidicolous (Prendini 2001a) scorpions with a discontinuous distribution in the Greater Antilles (Cuba and Hispaniola) and northern South America (Brazil, Colombia, Guyana, and Venezuela) (Appendix 1). These scorpions are unique in possessing the ability to stridulate audibly by scraping nodules and/or ridges on the dorsal surfaces of their pectines against granules on the ventral surfaces of mesosomal sternite III, a remarkable behavior that presumably functions to deter would-be predators (Pocock 1904; Lourenço & Cloudsley-Thompson 1995; Armas 2001; Lourenço 2007). Lourenço (1986) considered the stridulation organ to be synapomorphic for *Rhopalurus*, a hypothesis that has yet to be tested cladistically.

The taxonomic distinction between *Rhopalurus* and another New World buthid scorpion genus, *Centruroides* Marx 1890, distributed from the southwestern USA throughout Mexico, Central America, the Greater and Lesser Antilles, to northern South America (Colombia, Ecuador, and Venezuela), remains unclear. The two genera are separated primarily according to the presence, in *Rhopalurus*, of the stridulation organ on opposing surfaces of sternite III and pectines, which is absent in *Centruroides* (Lourenço 1979; Sissom 1990). The stridulation organ is variably developed within the genus, however, and the species of *Rhopalurus* form a rather heterogeneous assemblage in other respects. Evidence from ovariuterine morphology (Volschenk et al. 2008) and DNA sequences (L.A. Esposito, E.S. Volschenk & L. Prendini, in prep.) suggests that *Rhopalurus* may be paraphyletic with respect to *Centruroides*.

Rhopalurus was last revised by Lourenço (1982). Numerous changes to its composition have been made since then (Lourenço 1984, 1986, 2002, 2007; Armas & Marcano Fondeur 1987; Lourenço & Pinto-da-Rocha 1997; Armas 1999; Lourenço et al. 2004; Lenarducci et al. 2005; Teruel 2006; Teruel & Armas 2006; Teruel & Roncallo 2008; Teruel & Tietz 2008; Lourenço 2008). These include the description of 10 new species, one of which was subsequently synonymized, and two new subspecies; the resurrection of a species previously placed in synonymy; the elevation of a subspecies to species rank; the resurrection of a monotypic genus, *Physoctonus* Mello-Leitão 1934, to accommodate a species once placed in *Rhopalurus*; and the creation of another monotypic genus, *Troglorhopalurus* Lourenço et al. 2004, to accommodate a new troglomorphic species. The validity of *Physoctonus* and *Troglorhopalurus* is presently unclear. The systematics of *Rhopalurus* and related genera warrants reinvestigation, including detailed morphological revision and rigorous cladistic analysis based on morphological and molecular data.

Three species of *Rhopalurus* are endemic to Hispaniola (Armas 1999, 2001; Fet & Lowe 2000; Teruel 2005, 2006; Fig. 1). *Rhopalurus abudi* Armas & Marcano Fondeur 1987 (Figs. 2, 5A, B, 6A, 7A, 8, 11) and *Rhopalurus bonettii* Armas 1999 (Figs. 3, 5C, D, 6B, 7B, 9) are endemic to the Dominican Republic (DR), whereas *Rhopalurus princeps* (Karsch 1879) (Figs. 4, 5E, F, 6C, 7C, 10) also occurs in Haiti. *Rhopalurus abudi*, described on the basis of a single female specimen from Isla Saona, La Romana Province, off the southeast coast of the DR, is the least known of the three species and among the least known species in the genus. No new records of this species have been reported in the literature since the original description (Armas & Marcano Fondeur 1987; Armas et al. 1999; Teruel 2005, 2006). Lourenço & Pinto-da-Rocha (1997:181) suggested that it may be a junior synonym of *R. princeps* (see also Fet & Lowe 2000:217).

In July 2004, an expedition to collect arachnids in the DR was conducted by EV and JH. During the course of that expedition, a series of new specimens of *R. abudi*, including 19 adult males and 14 adult females, was collected in humid coastal forest at two nearby localities on the eastern side of Parque Nacional del Este, La Altagracia Province, southeastern DR. These specimens represent the first records of *R. abudi* on mainland Hispaniola, the first male specimens of the species to be collected, and the first records of a *Rhopalurus* species from a humid coastal forest habitat. On the basis of this new material, we provide a detailed redescription of *R. abudi*, including a comparison with the other two species of *Rhopalurus* endemic to Hispaniola.

METHODS

Specimens were collected using ultraviolet (UV) light detection at night or by rolling limestone boulders during

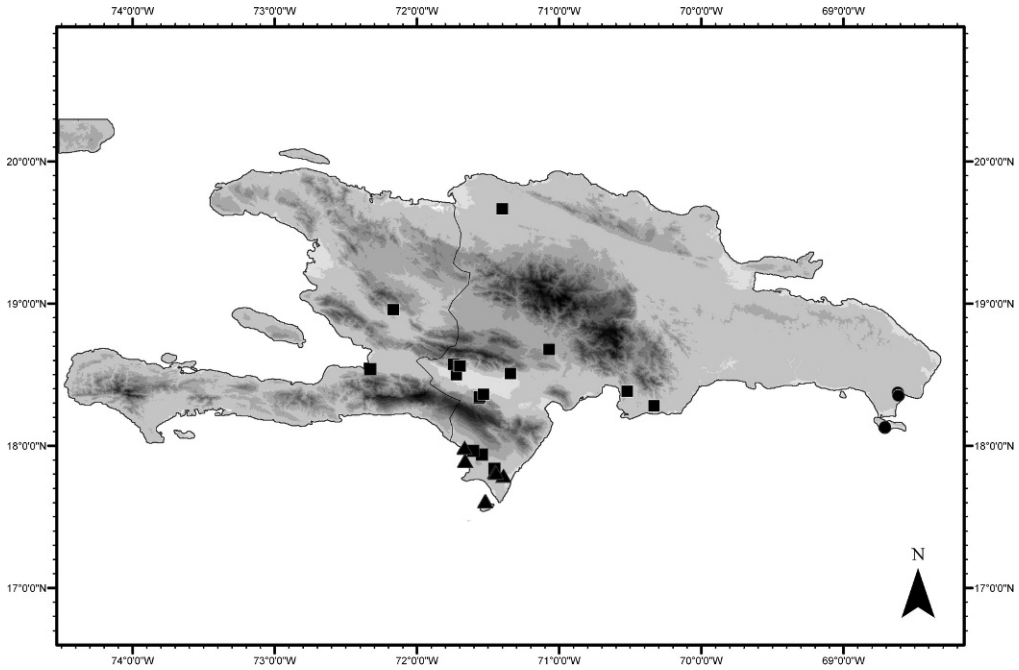

Figure 1.—Map of Hispaniola showing new and published locality records for *Rhopalurus abudi* Armas & Marcano Fondeur 1987 (circles), *Rhopalurus bonettii* Armas 1999 (triangles) and *Rhopalurus princeps* (Karsch 1879) (squares).

the day. Geographical coordinates and elevation were recorded with a portable Garmin GPS V Personal Navigator device, using the WGS84 datum. Most specimens were preserved in the field in 75% ethanol. One specimen from each locality was preserved in 95% ethanol for future DNA isolation.

Specimens were examined using a Nikon SMZ1500 dissection stereomicroscope. Hemispermatophores were dissected following the method described by Prendini et al. (2006) and the soft paraxial tissues dissected away from the capsule area using minuten entomology pins prior to examination in 75% ethanol. Specimens for which tissue could not be completely removed from the capsule area were dehydrated in ethanol (80% for 10 min, 95% for 10 min), followed by isopropanol (100% for 10 min), and then cleared in clove oil for ~ 20 min. Specimens were measured using Mitutoyo® digital calipers and an ocular micrometer. Ultraviolet fluorescence and conventional light photomicrographs were prepared, following a modified version of the method outlined by Volschenk (2005), using a Microptics™ ML-1000 digital imaging system, and the digital images subsequently edited and prepared into plates with the aid of Adobe Photoshop and Corel Draw.

Specimens of *R. abudi*, other species of *Rhopalurus* and related taxa studied for comparison (Appendix 2) are deposited in the following collections: American Museum of Natural History (AMNH), New York, USA, incorporating the Alexis Harington (AH) Collection; Natur-Museum Senckenberg, Frankfurt (SMF), Germany; Zoologisches Museum der Humboldt-Universität, Berlin (ZMB), Germany; Zoologisches Museum der Universität Hamburg (ZMH), Germany. Reference numbers (ESV and LP), provided on labels with the specimens, correspond to entries in the specimen databases of the author with the corresponding initials.

General anatomy follows Hjelle (1990) and Sissom (1990), trichobothria follows Vachon (1974), carination follows Prendini (2001b), and hemispermatophore follows reinterpretation of the character system in Buthidae, to be described fully elsewhere. Ovariuterine anatomy follows Volschenk et al. (2008). Measurements follow Stahnke (1970), Lamoral (1979), and Prendini (2001b).

TAXONOMY

Family Buthidae C.L. Koch 1837
Genus *Rhopalurus* Thorell 1876
Rhopalurus abudi Armas & Marcano Fondeur 1987
(Figs. 2, 5A, B, 6A, 7A, 8, 11)

Rhopalurus abudi Armas & Marcano Fondeur 1987:19–20, fig. 4, pl. II, tab. 10; Rudloff 1994:9; Lourenço & Pinto-da-Rocha 1997:181; Kovařík 1998:118; Armas 1999:127; Armas et al. 1999:30–32; Armas 2001:246, tab. 1; Fet & Lowe 2000:217; Fet et al. 2003:3, tab. 1; Teruel 2005:165; Armas 2006:6; Teruel 2006:50, 51, fig. 12 e; Teruel et al. 2006:220, 221, 223, fig. 1; Volschenk et al. 2008:653, 658, 659, 663, 664, 674, fig. 1D, tab. 1, tab. 2.

Material examined.—DOMINICAN REPUBLIC: *La Altagracia Province*: Parque Nacional del Este: Cabo Flaso (entrance zone), 18°22′25″N, 68°37′01″W, 14 July 2004, E.S. Volschenk & J. Huff, 67.7 m, 1 ♂ (AMNH [ESV6091]); Track between ranger station (at Boca de Yuma) and Punta Faustino, 18°21′17.2″N, 68°36′52.3″W, 14 July 2004, E.S. Volschenk & J. Huff, 3.3 m, dense canopy humid forest, hand collected at night with blacklights, from limestone outcrops, especially along an old rock wall along the start of the track, 1 ♀, 48 first instars (AMNH [ESV6010]), 1 ♀, 22 first instars (AMNH [ESV6019]), 1 ♀ 32 first instars (AMNH [ESV6039]), 11 ♂, 4 ♀, 1 subad. ♂, 1 subad. ♀, 2 juv. (AMNH [ESV6072]), 1

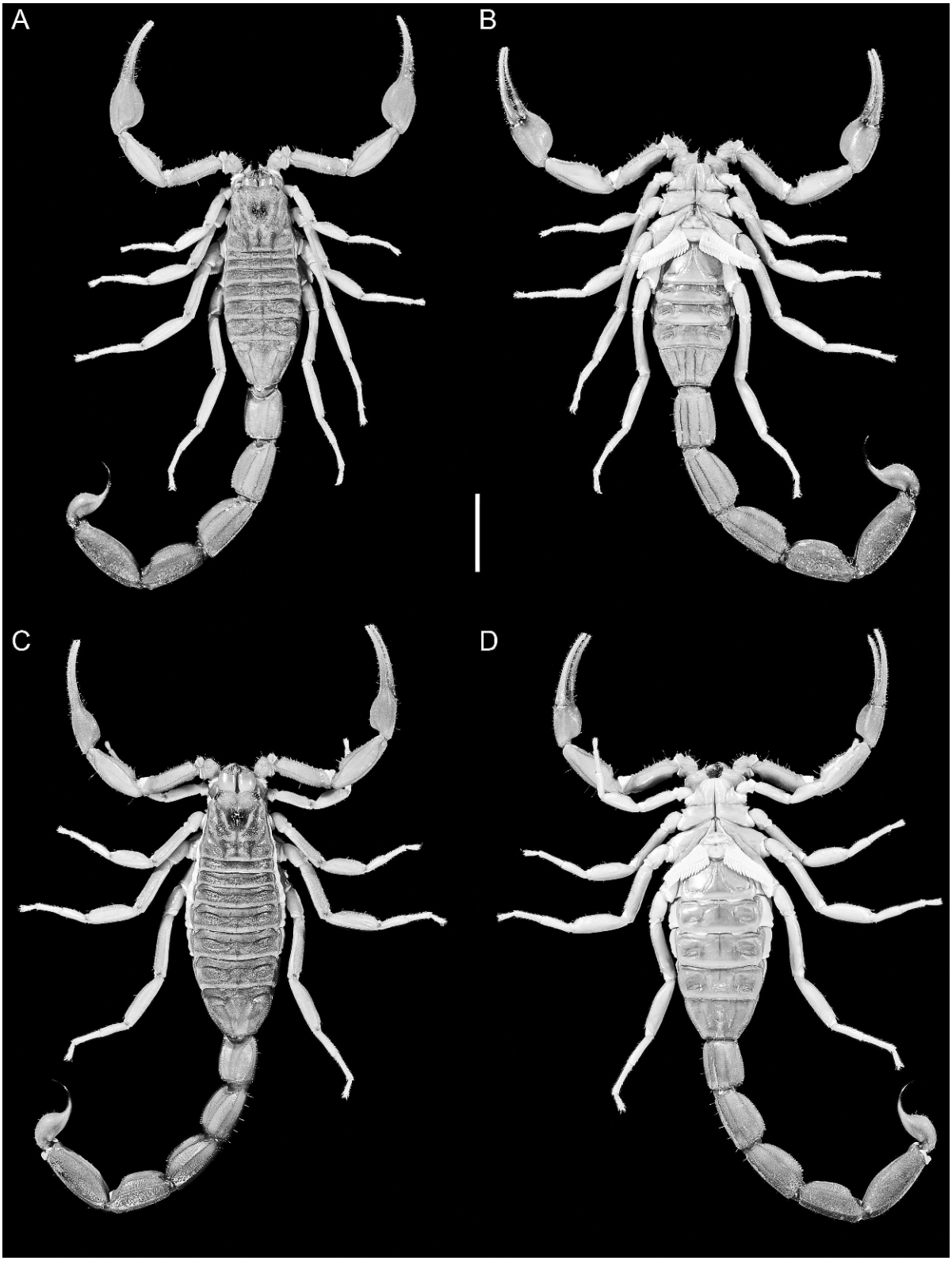

Figure 2.—*Rhopalurus abudi* Armas & Marcano Fondeur 1987, habitus: A, B. ♂ (AMNH). C, D. ♀ (AMNH). A, C. Dorsal aspect. B, D. Ventral aspect. Scale bars = 5 mm.

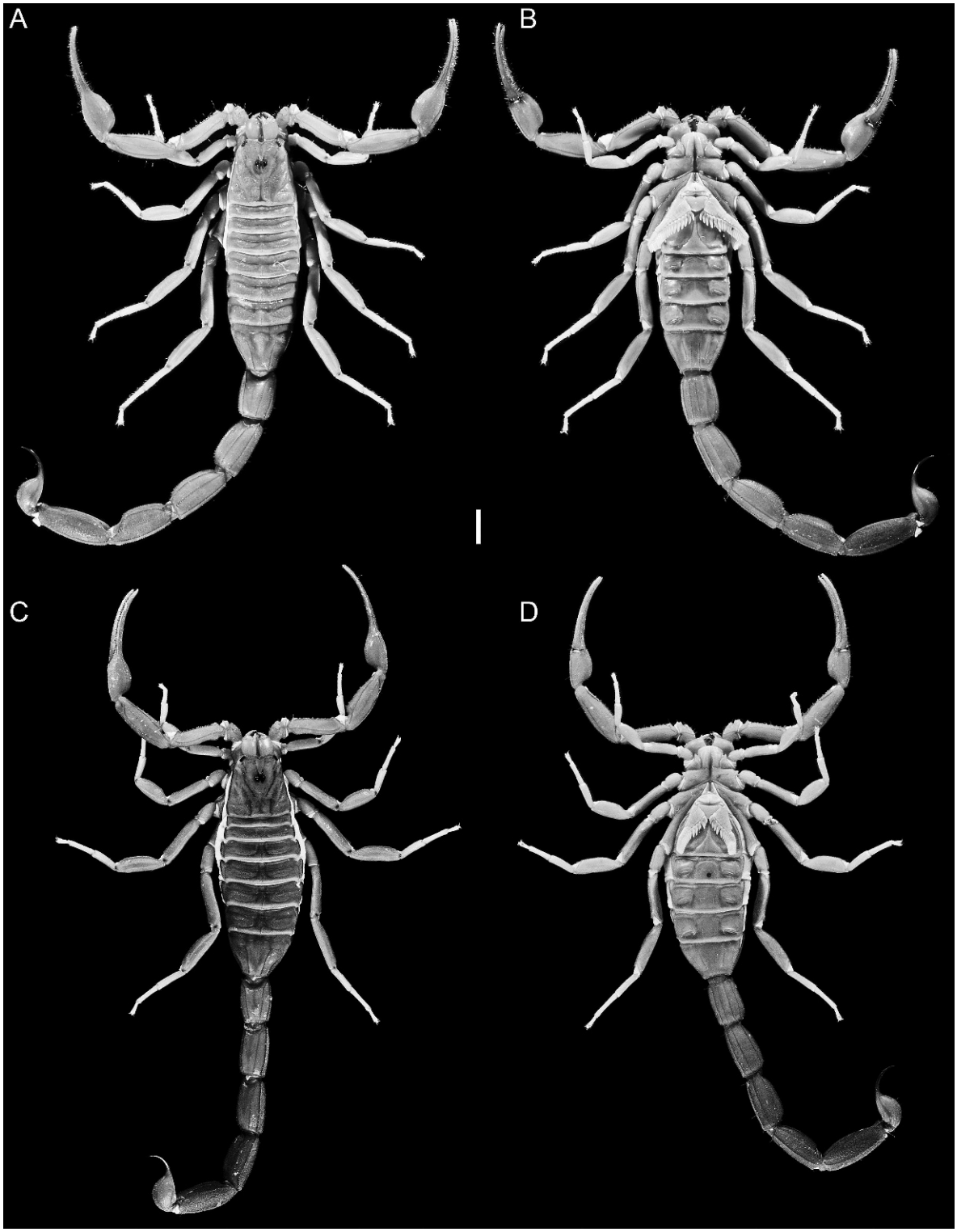

Figure 3.—*Rhopalurus bonettii* Armas 1999, habitus: A, B. ♂ (AMNH). C, D. ♀ (AMNH). A, C. Dorsal aspect. B, D. Ventral aspect. Scale bars = 5 mm.

♂, 1 ♀ (AMNH [ESV7110]), 1 ♂, 1 ♀ (AMNH [ESV7117]), 1 ♂, (AMNH [ESV7120]), 1 ♂, 1 ♀ (AMNH [ESV7242]), 1 ♂, 1 ♀ (AMNH [ESV7303]), 1 ♀ (AMNH [ESV7306]), 1 ♂, 1 ♀ (AMNH [ESV7705]), 1 ♂, 1 ♀ (AMNH [ESV7937]), 3 juv. (AMNH), 1 juv. (AMNH [LP 3268]).

Relationships.—Based on morphological similarity, *R. abudi* appears to be most closely related to *R. bonettii*, and was compared directly with the latter by Armas (1999: 127). When compared to *R. princeps*, the third *Rhopalurus* species occurring on Hispaniola, *R. abudi* and *R. bonettii* are similar

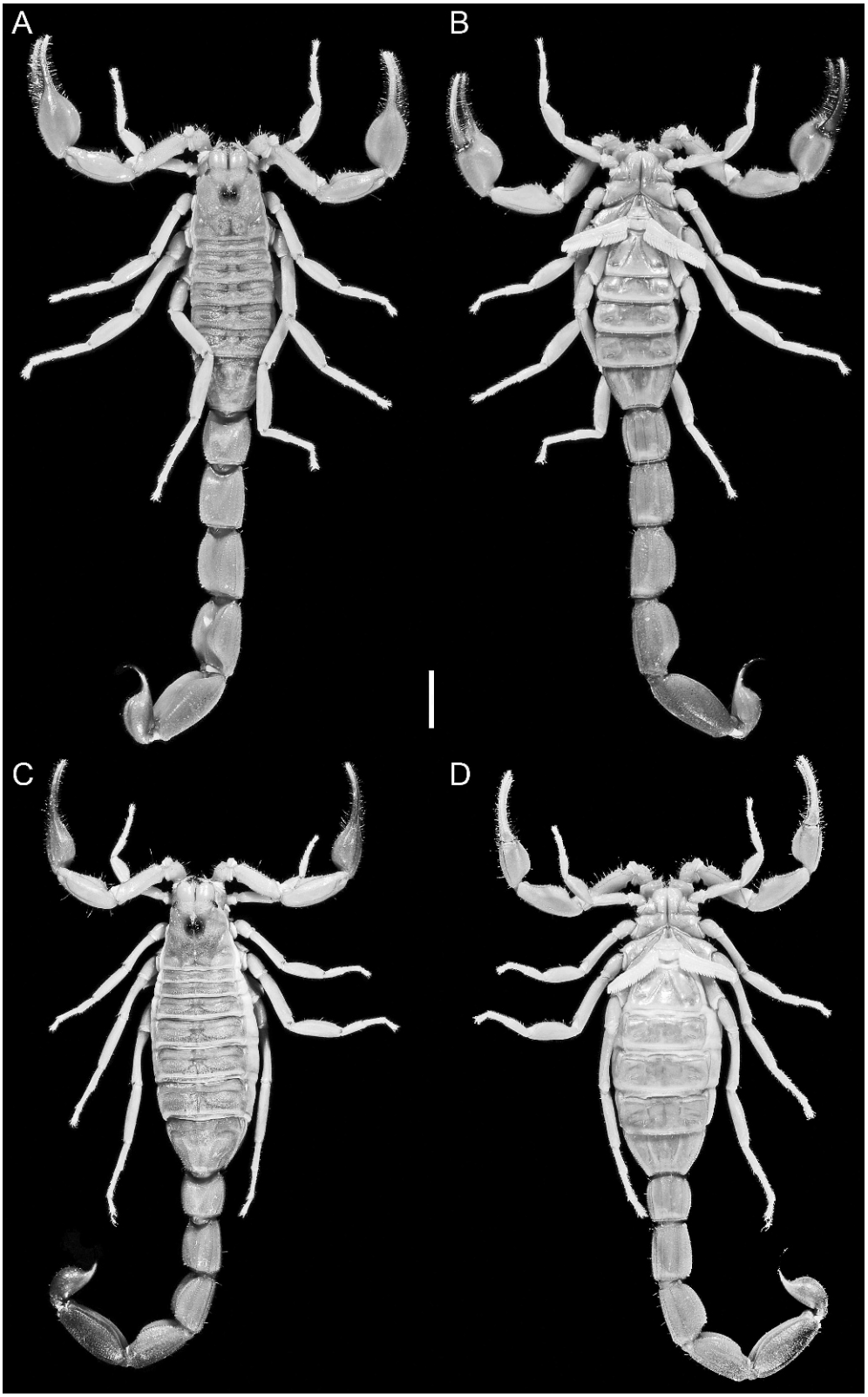

Figure 4.—*Rhopalurus princeps* (Karsch 1879), habitus: A, B. ♂ (AMNH). C, D. ♀ (AMNH). A, C. Dorsal aspect. B, D. Ventral aspect. Scale bars = 5 mm.

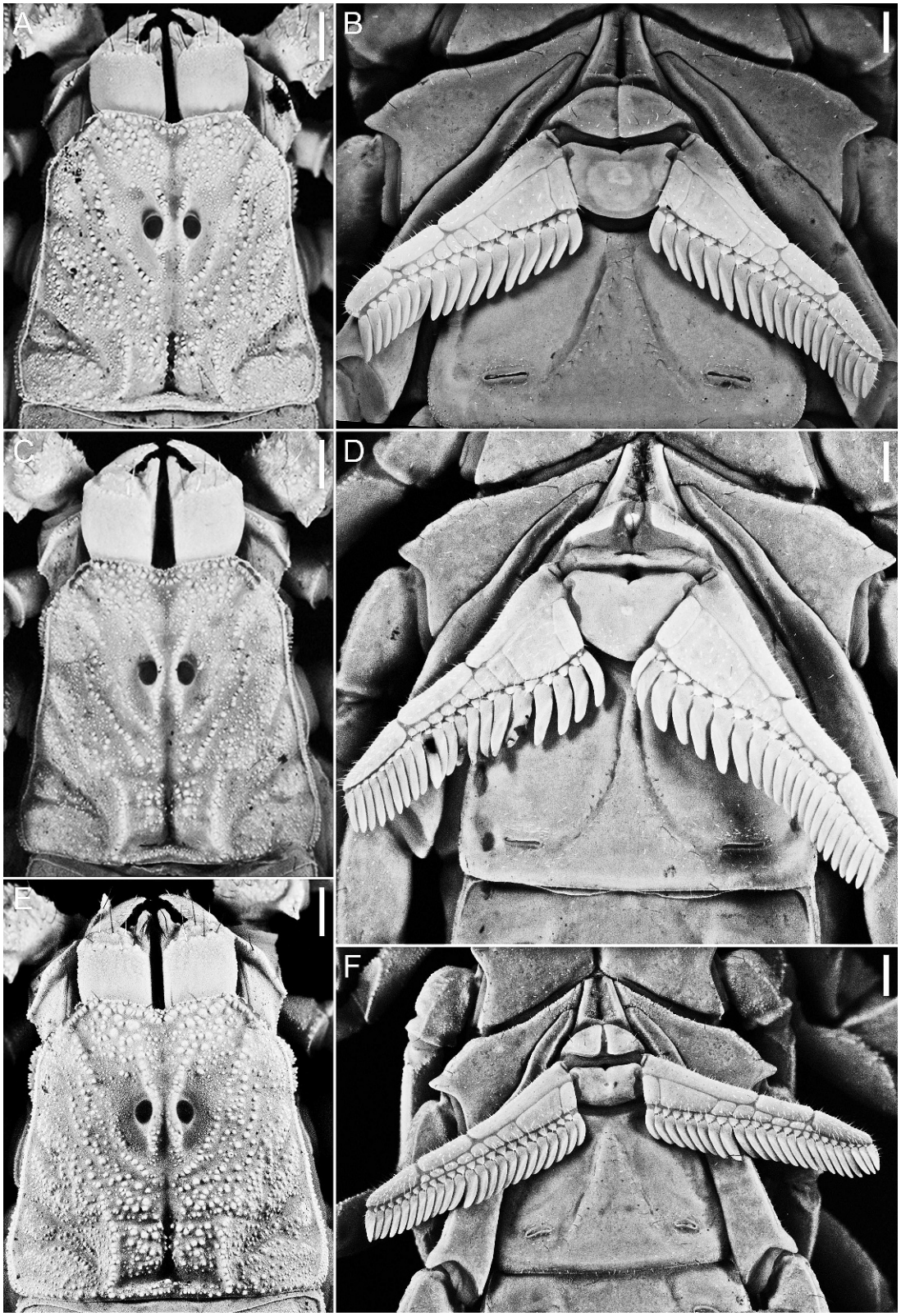

Figure 5.—Carapace, dorsal aspect (A, C, E), and sternum, genital operculum and pectines, ventral aspect (B, D, F): A, B. *Rhopalurus abudi* Armas & Marcano Fondeur 1987, ♂ (AMNH). C, D. *Rhopalurus bonettii* Armas 1999, ♂ (AMNH). E, F. *Rhopalurus princeps* (Karsch 1879), ♂ (AMNH). Scale bars = 1 mm.

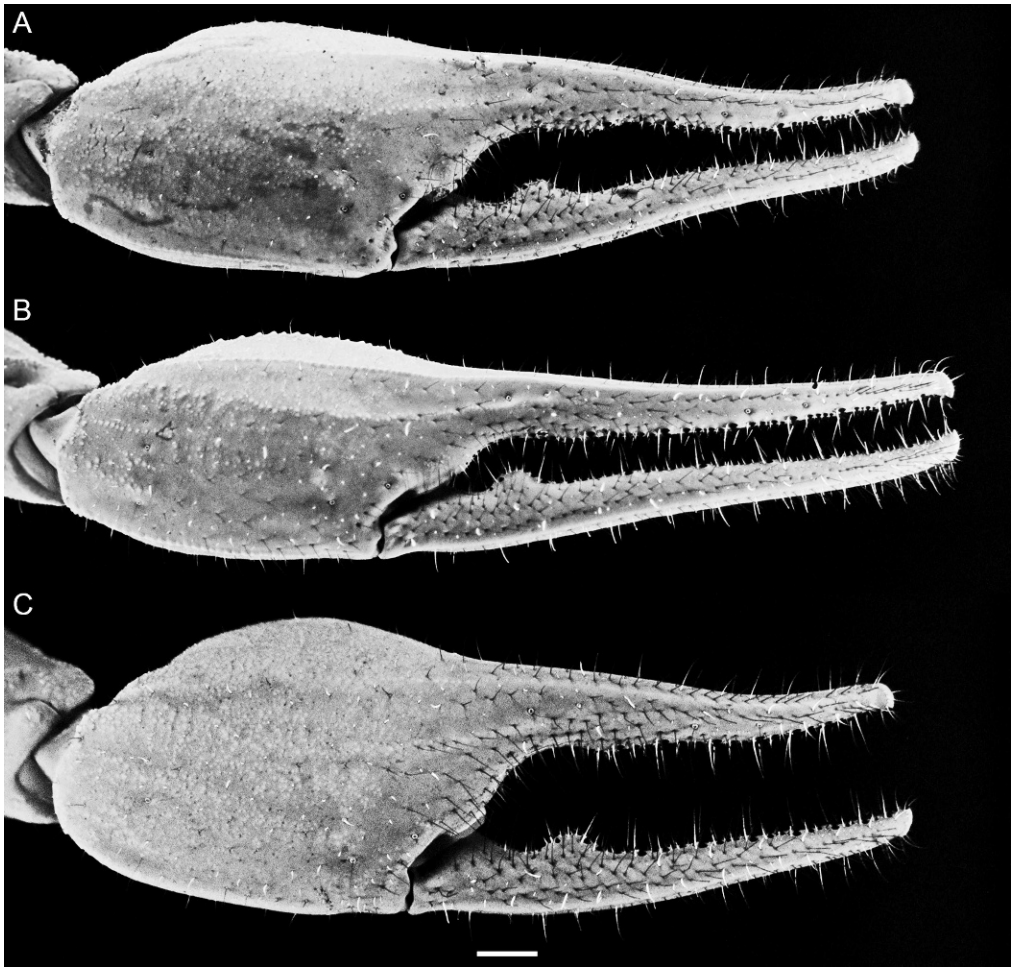

Figure 6.—Pedipalp chela manus, external aspect: A. *Rhopalurus abudi* Armas & Marcano Fondeur 1987, ♂ (AMNH). B. *Rhopalurus bonettii* Armas 1999, ♂ (AMNH). C. *Rhopalurus princeps* (Karsch 1879), ♂ (AMNH). Scale bar = 1 mm.

in carinal development and shape of the carapace (Figs. 5A, C, E; Tables 1–3); development of the pectines (Figs. 5B, D, F); carinal development and length of the pedipalp chela manus (Figs. 6, 7; Tables 1–3); and length of the metasomal segments (Figs. 8–11; Tables 1–3). Lourenço & Pinto-da-Rocha (1997:181) suggested that *R. abudi* may be a junior synonym of *R. princeps* but the two species differ in many respects (Figs. 2, 4, 5A, B, E, F, 6A, C, 7A, C). *Rhopalurus princeps* appears to be more closely related to *Rhopalurus* species on Cuba than to *R. abudi* and *R. bonettii*.

Diagnosis.—*Rhopalurus abudi* differs conspicuously from *R. bonettii* on the basis of the sexually dimorphic pedipalp chelae of the adult male. This dimorphism is well developed in *R. abudi*: the chela manus of the adult male is incrassate and the fingers strongly curved proximally (fixed finger curved dorsally, movable finger curved ventrally), such that only the distal portion of the fingers connect and a distinctive gap is present between them proximally, when closed (Fig. 6A). The chela manus of female *R. abudi* is not incrassate and the fingers are not curved proximally, such that the fingers connect along most of their length and little to no gap is present between them proximally, when closed (Fig. 7A). This dimorphism is considerably less developed in *R. bonettii*, in which the male and female chelae are similar, the manus of the male being only slightly incrassate, relative to the female, and the fingers not curved proximally, such that the fingers connect along most of their length and little to no gap is present between them proximally, when closed (Figs. 6B, 7B).

The two species differ further in development of the pectines. The pectines of *R. bonettii* are very broad proximally, with a more pronounced basal plate (Armas 1999), and the first 6–7 pectinal teeth are noticeably larger than the rest (Fig. 5D), compared to *R. abudi*, in which the pectines are narrower proximally, with a less pronounced basal plate, and the pectinal teeth similar in size (Fig. 5B). These morphological differences appear to be associated with differences in behavior. In the field, *R. bonettii* was observed to stridulate more loudly than *R. abudi* (and *R. princeps*, in which the pectines are even less developed).

Other differences between the two species are as follows. The coloration of *R. abudi* is darker, due to extensive infuscation, than *R. bonettii*, which is pale (Armas 1999; Figs. 2, 3). The carapace, pedipalp chelae, legs and tergites are noticeably infuscated in *R. abudi* but pale in *R. bonettii*. The metasoma and telson of *R. abudi* are strongly infuscated laterally and ventrally, especially on segments II–IV, becoming more so distally, with each segment darker than the preceding one and segment V darkest. The metasoma and telson of *R.*

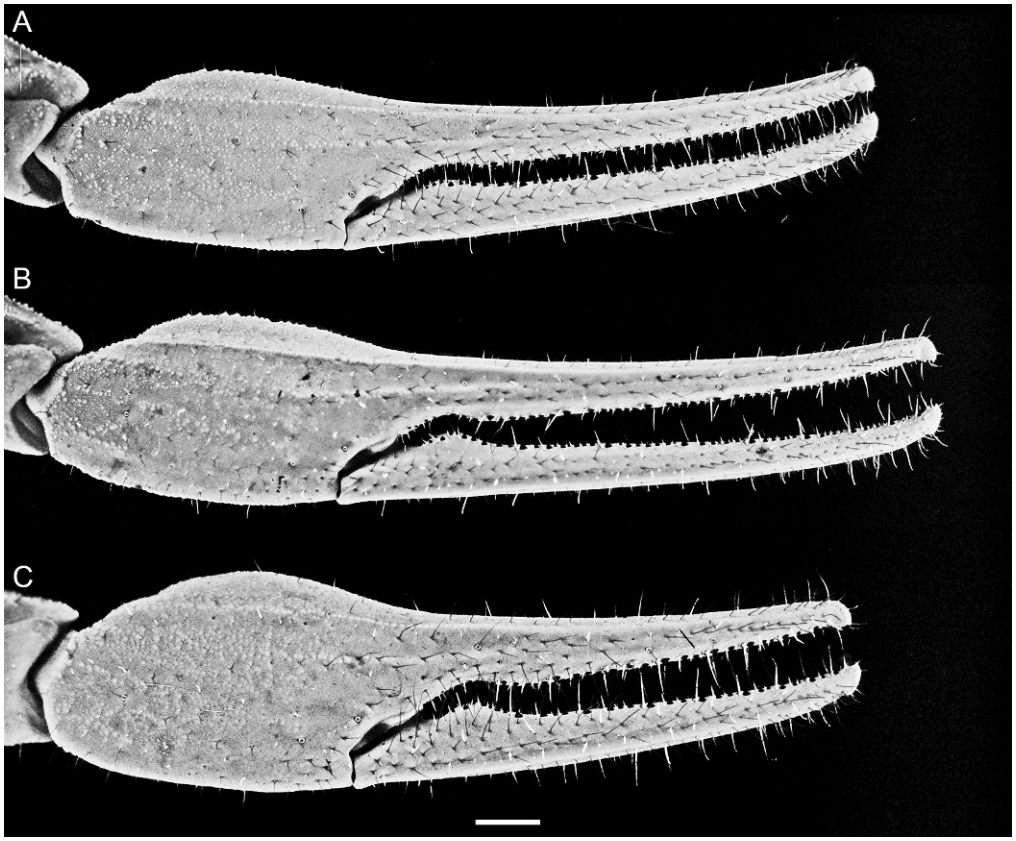

Figure 7.—Pedipalp chela manus, external aspect: A. *Rhopalurus abudi* Armas & Marcano Fondeur 1987, ♀ (AMNH). B. *Rhopalurus bonettii* Armas 1999, ♀ (AMNH). C. *Rhopalurus princeps* (Karsch 1879), ♀ (AMNH). Scale bar = 1 mm.

bonettii are weakly infuscated on segments III–V or IV and V only. The carapace and tergites are more coarsely and densely granular in *R. abudi* than in *R. bonettii*. The submedian sulci of sternite III are convergent in *R. abudi* and subparallel in *R. bonettii* (Armas & Marcano Fondeur 1987; Armas 1999; Figs. 15, 17). The pale, raised posteromedial surface of sternite V in the male is more prominent in *R. bonettii* than in *R. abudi*. The metasomal segments of *R. abudi* are shorter and broader (i.e., the width/length ratio is smaller) than those of *R. bonettii*, which are longer and narrower (i.e., the width/length ratio is greater) (Armas 1999; Figs. 8, 9, Tables 1, 2). The granulation, ventromedian, and ventrolateral carinae of metasomal segment V are less developed compared with those of the preceding segments such that the segment has a shinier, rounded appearance in *R. abudi* (Fig. 8). The granulation, ventromedian, and ventrolateral carinae of metasomal segment V are more developed in *R. bonettii* such that the segment has a matt, angular appearance (Fig. 9).

Description.—The following description is based on the specimens illustrated in Figs. 2, 5A, B, 6A, 7A, 8, 11 and listed in Table 1.

Coloration: Chelicerae brownish-yellow with finely reticulate infuscation on manus, becoming more intense distally; fingers brownish-yellow, not infuscated, teeth darker due to sclerotization. Carapace brownish-yellow with darker tan-brown patches of infuscation around median ocelli (Figs. 2A, C); lateral surfaces, carinae and lateral ocular tubercles with blackish-brown infuscation. Pedipalp femur and patella brownish-yellow, carinae noticeably darker; femur lightly and uniformly infuscated; patella not infuscated; chela manus reddish-brown, darker than femur and patella, entirely infuscated, becoming gradually darker towards base of fingers; chela fingers infuscated, becoming gradually paler distally. Legs pale brownish-yellow; external surfaces of femur and patella lightly and uniformly infuscated. Mesosoma brownish-yellow with broad, transverse band across each tergite; pretergites infuscated, tan-brown; post-tergites with reticulate infuscation concentrated near carinae, becoming paler posteriorly; posterior margins pale brownish-yellow, not infuscated. Sternites tannish-brown, without infuscation; VII with darker carinae. Metasomal segments infuscated, becoming gradually darker ventrally and posteriorly, carinae darker than intercarinal surfaces; each segment darker than preceding segment, I and II, tan-brown, III, reddish-brown, IV and V, dark to very dark tan. Telson dark reddish-brown, not infuscated; aculeus black distally.

Chelicerae: Movable finger, ventral surface with two subdistal teeth; distal external and distal internal teeth equal, opposable. Fixed finger, ventral surface with single denticle; ventral surface with dense brush of long, fine macrosetae.

Carapace: Carapace coarsely and sparsely granular, mainly on interocular and lateral surfaces. Anterior and posterior margins of carapace procurved; anterior margin with shallow median notch (emargination), without median projection (epistome) (Fig. 5A). Lateral ocular tubercles each with three macro-ocelli and one (anterior) micro-ocellus, situated dorsal

Table 1.—Meristic data for three male and three female specimens of *Rhopalurus abudi* Armas & Marcano Fondeur 1987 deposited in the collection of the American Museum of Natural History (AMNH), New York. [1] Sum of carapace, tergites I–VII, metasomal segments I–V, and telson; [2] sum of tergites I–VII; [3] sum of metasomal segments I–V and telson; [4] measured along an axis parallel to the dorsal surface; [5] measured from base of condyle to tip of fixed finger.

	Sex	♂	♂	♂	♀	♀	♀
	Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH
	Reference number	ESV7937	ESV7303	ESV7117	ESV7937	ESV7303	ESV7117
Total length[1]		67.45	69.71	68.75	77.48	91.67	87.83
Carapace	length	7.50	8.50	8.01	8.75	10.23	10.28
	anterior width	4.67	6.90	6.03	6.80	8.18	7.98
	posterior width	7.65	8.82	8.08	9.32	10.84	11.29
	eye diameter	0.63	0.74	0.63	0.72	0.79	0.73
	interocular distance	0.63	0.71	0.53	0.58	0.66	0.74
Mesosoma	total length[2]	18.96	21.77	17.85	23.32	28.27	28.59
Sternite VII	length	5.08	5.93	4.89	5.86	7.08	6.92
	width	6.98	8.16	7.36	8.71	10.86	10.30
Metasoma	total length[3]	48.42	54.51	53.08	54.16	63.36	63.36
Metasoma I	length	6.36	7.32	7.22	7.08	8.59	8.47
	width	4.37	5.03	4.69	5.00	5.73	5.82
	height	3.69	4.12	3.19	4.00	3.91	4.09
Metasoma II	length	7.48	8.30	8.13	8.29	9.70	9.91
	width	4.23	4.84	4.70	4.73	5.40	5.45
	height	3.52	4.01	3.73	4.06	4.69	4.63
Metasoma III	length	8.13	8.95	8.71	9.02	9.52	10.25
	width	4.18	5.03	4.81	4.59	5.41	5.48
	height	3.84	4.09	4.00	4.11	4.56	4.77
Metasoma IV	length	8.58	9.39	9.25	9.07	10.76	10.63
	width	4.39	5.03	4.89	4.72	5.29	5.46
	height	3.59	4.10	3.92	3.99	4.50	4.57
Metasoma V	length	9.99	11.32	10.88	11.27	13.33	12.87
	width	4.28	4.90	4.74	4.63	4.47	5.33
	height	3.54	4.12	3.79	4.01	4.53	4.79
Telson	total length[4]	7.88	9.23	8.89	9.43	11.46	11.23
	vesicle length	4.44	5.26	5.15	5.22	6.43	6.38
	vesicle width	2.55	2.90	2.84	2.94	3.46	3.59
	vesicle height	2.55	2.91	2.67	2.90	3.44	3.49
	aculeus length	3.54	3.86	3.76	4.22	5.33	5.41
Pedipalp	total length[5]	29.96	35.72	33.57	35.69	42.36	41.93
	trochanter length	3.74	4.24	3.49	3.92	4.47	4.72
Femur	length	6.92	7.49	7.32	8.02	9.05	8.74
	width	2.25	2.28	2.37	2.32	2.84	2.89
	height	1.43	1.83	1.71	1.81	2.54	2.05
Patella	length	7.45	8.92	8.66	8.99	10.98	10.57
	width	2.95	3.25	3.06	3.35	3.81	3.76
	height	2.06	2.35	2.24	2.55	2.85	2.84
Chela	length	11.85	15.07	14.10	14.76	17.86	17.90
	width	3.09	3.96	4.06	2.87	3.49	3.22
	height	3.39	4.03	4.00	2.97	3.53	3.49
	fixed finger length	6.73	8.26	7.56	8.99	10.75	10.74
	ventroexternal carina length	4.66	5.32	5.38	5.02	6.00	5.96
	movable finger length	8.67	10.06	9.23	10.01	12.16	12.22
Pectines	total length	7.57	7.79	7.12	7.36	8.74	8.43
	length along dentate margin	6.86	7.24	6.43	6.66	7.91	7.54
	tooth count (left/right)	23/23	23/23	22/23	20/20	22/21	20/20

to posterior macro-ocellus; posterior micro-ocellus absent. Median ocelli considerably larger than lateral ocelli, situated anteromedially. Median ocular macrosetae fine, acuminate; lateral ocular macrosetae absent. Ocular tubercle with pair of costate-granular superciliary carinae, protruding slightly above median ocelli. Five other pairs of costate-granular carinae present, disconnected. Anteromedian sulcus moderately deep, ovate; posteromedian sulcus narrow, shallow anteriorly, deep posteriorly; posterolateral sulci shallow, wide, curved; posteromarginal sulcus deep, narrow.

Sternum: Subtriangular (Fig. 5B). Median longitudinal sulcus Y-shaped, shallow anteriorly, deep and narrow posteriorly.

Genital operculum: Completely divided longitudinally; macrosetae evenly distributed. Genital papillae present (♂), absent (♀).

Table 2.—Meristic data for three male and three female specimens of *Rhopalurus bonettii* Armas 1999 deposited in the collection of the American Museum of Natural History (AMNH), New York. [1] Sum of carapace, tergites I–VII, metasomal segments I–V, and telson; [2] sum of tergites I–VII; [3] sum of metasomal segments I–V and telson; [4] measured along an axis parallel to the dorsal surface; [5] measured from base of condyle to tip of fixed finger.

	Sex	♂	♂	♂	♀	♀	♀
	Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH
	Reference number	ESV7112	ESV7127	ESV7126	ESV7127	ESV7112	ESV6005
Total length[1]		64.64	63.42	63.48	70.31	76.96	71.72
Carapace	length	7.33	7.22	7.35	7.63	9.30	7.89
	anterior width	5.55	5.38	5.33	5.91	7.09	6.10
	posterior width	7.16	6.99	7.51	7.67	9.51	7.58
	eye diameter	0.55	0.57	0.55	0.62	0.58	0.64
	interocular distance	0.52	0.56	0.50	0.61	0.53	0.55
Mesosoma	total length[2]	18.10	18.35	18.93	21.24	23.48	21.44
Sternite VII	length	4.50	4.41	4.8	5.22	6.16	5.43
	width	6.53	6.09	6.53	7.48	8.76	7.56
Metasoma	total length[3]	47.02	46.52	47.48	48.74	56.53	48.84
Metasoma I	length	6.31	6.28	6.14	6.54	7.66	6.84
	width	3.87	3.65	4.04	4.05	4.60	4.02
	height	3.35	3.28	3.59	3.52	4.02	3.46
Metasoma II	length	7.31	7.35	7.32	7.66	8.76	7.76
	width	3.89	3.60	3.80	4.02	4.43	3.67
	height	3.30	3.50	3.38	3.35	3.87	3.34
Metasoma III	length	7.84	7.90	8.05	7.85	9.18	8.04
	width	3.78	3.70	3.91	3.82	4.32	3.90
	height	3.36	3.38	3.42	3.50	3.96	3.32
Metasoma IV	length	8.18	7.79	8.29	8.52	9.86	7.79
	width	3.83	3.68	4.06	4.01	4.35	3.74
	height	3.36	3.29	3.44	3.69	3.77	3.41
Metasoma V	length	9.56	9.64	9.85	9.86	11.26	9.92
	width	3.77	3.63	4.03	3.62	4.25	3.68
	height	3.40	3.17	3.34	3.59	3.90	3.43
Telson	total length[4]	7.82	7.56	7.83	8.31	9.81	8.49
	vesicle length	4.52	4.50	4.57	4.56	5.67	4.87
	vesicle width	2.59	2.46	2.73	2.75	3.27	2.88
	vesicle height	2.69	2.50	2.70	2.59	3.22	2.79
	aculeus length	3.22	3.77	3.16	3.98	4.99	3.74
Pedipalp	total length[5]	32.64	31.82	33.49	34.96	40.85	35.35
	trochanter length	3.36	3.53	3.64	3.95	4.49	3.97
Femur	length	7.13	6.77	6.97	7.34	8.71	7.46
	width	2.10	1.98	2.08	2.20	2.71	2.26
	height	1.58	1.45	1.46	1.61	1.73	1.83
Patella	length	8.49	8.16	9.00	9.16	10.69	9.11
	width	2.79	2.63	3.05	2.91	3.28	3.01
	height	2.06	2.02	2.08	2.24	2.53	2.13
Chela	length	13.66	13.36	13.88	14.51	16.96	14.81
	width	2.84	2.85	3.20	2.76	3.07	2.77
	height	2.98	2.94	3.28	2.76	3.21	3.10
	fixed finger length	7.55	6.87	7.54	8.63	10.21	8.33
	ventroexternal carina length	4.44	4.65	4.76	4.88	5.71	4.72
	movable finger length	9.02	9.04	9.32	9.93	11.59	9.96
Pectines	total length	7.05	6.35	6.53	6.89	7.50	6.47
	length along dentate margin	6.43	6.00	6.22	5.93	6.82	5.93
	tooth count (left/right)	24/23	22/23	22/21	21/20	20/20	19/19

Pectines: Pectines broad (Fig. 5B), dorsal surfaces with stridulatory nodules. First proximal median lamella unmodified in ♀. Fulcra prominent. Proximal pectinal teeth not noticeably larger than others in ♂ and ♀. Pectinal tooth counts, 17–24 (♂), 19–22 (♀).

Pedipalps: Femur with five distinct carinae; dorsoexternal, dorsointernal, ventrointernal and externomedian carinae continuous, costate-granular; internomedian carina discontinuous, comprising row of isolated spiniform granules; externomedian and dorsoexternal carinae each with an acuminate macroseta distally; intercarinal surfaces finely and uniformly granular.

Patella with seven distinct carinae; dorsomedian, dorsointernal, ventrointernal, ventroexternal, externomedian, dorsoexternal carina continuous, costate-granular; internomedian carina discontinuous, comprising several large, well-spaced

Table 3.—Meristic data for three male and three female specimens of *Rhopalurus princeps* (Karsch 1879) deposited in the collection of the American Museum of Natural History (AMNH), New York. [1] Sum of carapace, tergites I–VII, metasomal segments I–V, and telson; [2] sum of tergites I–VII; [3] sum of metasomal segments I–V and telson; [4] measured along an axis parallel to the dorsal surface; [5] measured from base of condyle to tip of fixed finger.

	Sex	♂	♂	♂	♀	♀	♀
	Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH
	Locality or number	Is. Cabritos	ESV6033	LP 3260	Is. Cabritos	ESV6033	LP 3260
Total length[1]		59.90	47.27	51.19	69.19	66.32	55.21
Carapace	length	6.62	5.63	6.38	7.90	7.18	7.03
	anterior width	5.33	4.65	5.12	6.59	5.81	5.59
	posterior width	6.97	5.84	6.95	8.44	7.45	7.24
	eye diameter	0.58	0.46	0.45	0.62	0.52	0.48
	interocular distance	0.40	0.43	0.47	0.46	0.63	0.48
Mesosoma	total length[2]	17.67	14.00	17.06	21.87	20.58	19.23
Sternite VII	length	4.65	3.59	4.36	5.53	5.02	4.31
	width	6.43	5.51	6.60	8.36	7.81	7.68
Metasoma	total length[3]	42.90	35.94	41.52	49.00	45.32	45.63
Metasoma I	length	5.50	4.76	5.08	6.30	5.91	5.26
	width	4.19	3.24	4.11	4.90	4.30	4.50
	height	3.39	2.98	3.54	3.85	3.69	3.61
Metasoma II	length	6.55	5.47	6.17	7.24	6.72	6.85
	width	4.11	3.26	4.13	4.59	4.14	4.39
	height	3.39	2.86	3.43	3.89	3.68	3.62
Metasoma III	length	7.16	5.86	6.73	7.56	7.24	7.55
	width	4.16	3.53	4.24	4.74	4.22	4.30
	height	3.52	2.96	3.49	3.97	3.70	3.72
Metasoma IV	length	7.45	6.05	7.28	7.87	7.39	8.08
	width	4.65	3.67	4.51	4.93	4.52	4.55
	height	3.58	3.02	3.61	3.96	3.69	3.69
Metasoma V	length	9.03	7.46	8.91	11.37	9.51	9.62
	width	4.67	3.54	4.50	4.86	4.30	4.35
	height	3.40	2.89	3.42	3.81	3.63	3.60
Telson	total length[4]	7.21	6.34	7.35	8.66	8.55	8.27
	vesicle length	4.70	3.93	4.69	5.41	5.45	4.85
	vesicle width	2.51	2.41	2.62	3.27	3.06	2.99
	vesicle height	2.51	2.29	2.52	3.02	2.94	2.87
	aculeus length	3.40	2.48	3.46	3.77	4.05	4.61
Pedipalp	total length[5]	28.26	23.46	26.93	32.75	29.12	28.23
	trochanter length	3.21	2.71	2.87	4.20	3.40	3.44
Femur	length	6.14	4.73	5.54	7.12	6.28	5.86
	width	1.97	1.68	1.80	2.36	2.05	1.74
	height	1.72	1.40	1.61	1.96	1.82	1.74
Patella	length	6.98	6.17	6.94	7.97	7.45	7.18
	width	2.75	2.24	1.98	3.23	2.91	2.91
	height	2.10	1.84	2.44	2.56	2.22	2.25
Chela	length	11.93	9.85	11.58	13.46	11.99	11.75
	width	3.51	2.83	3.52	3.33	2.95	2.98
	height	3.54	2.81	3.39	3.40	3.02	2.89
	fixed finger length	5.45	4.34	5.06	6.58	6.00	6.08
	ventroexternal carina length	4.95	4.15	4.78	4.85	4.76	4.40
	movable finger length	7.07	6.05	6.94	8.25	7.98	7.28
Pectines	total length	6.34	5.14	6.67	6.99	6.25	5.75
	length along dentate margin	6.10	5.03	6.18	6.50	5.37	5.22
	tooth count (left/right)	25/24	24/25	25/26	22/23	21/22	21/20

spiniform granules proximally, becoming smaller distally; proximal tubercle moderately developed; dorsointernal carina not fused with ventrointernal carina; intercarinal surfaces smooth, except for ventral surface which is finely granular.

Chela manus (♂) incrassate, length along ventroexternal carina 33–51% greater than manus width, 32–37% greater than manus height (Table 1), fingers strongly curved proximally (fixed finger curved dorsally, movable finger curved ventrally), such that only connect distally and distinctive gap present between them proximally, when closed (Fig. 6A); manus (♀) not incrassate, length along ventroexternal carina 72–85% greater than manus width, 69–71% greater than manus height (Table 1), fingers not curved proximally, such that connect along most of length and little to no gap present between them proximally when closed (Fig. 7A). Chela with five distinct carinae; dorsomedian, dorsal secondary and

Figure 8.—*Rhopalurus abudi* Armas & Marcano Fondeur 1987, ♂ (AMNH), metasomal segments I–V and telson: A. Dorsal aspect. B. Lateral aspect. C. Ventral aspect. Scale bar = 1 mm.

ventroexternal carinae continuous, costate-granular (Figs. 6A, 7A); digital carina continuous, costate-granular, becoming obsolete proximally; dorsointernal carina discontinuous, comprising row of small granules distally, becoming obsolete proximally; other carinae absent; intercarinal surfaces smooth, except for internal surface where several low granules present. Movable finger with small lobe (eminence) proximally; movable finger length 72–89% (♂) or 99–105% (♀) greater than length along ventroexternal carina (Table 1); dentate margins of fixed and movable fingers each with eight oblique denticle rows, in addition to short apical row of four denticles; each row terminating in large denticle at proximal and distal ends; rows slightly imbricated, terminal denticle of each row displaced distally from the main row by space of one or more denticles; internal and external supernumerary denticles present in addition to internal and external accessory denticles; fingers each with an enlarged terminal denticle.

Trichobothria: Orthobothriotaxic, Type A, α configuration (femoral trichobothria d_1 and d_4 situated closer to dorsoexternal carina than d_3), with the following segment totals: femur 11 (5 dorsal, 4 internal, 2 external), patella 13 (5 dorsal, 1 internal, 7 external), and chela 15 (8 manus, 7 fixed finger). Total number of trichobothria per pedipalp, 39. Femoral trichobothrium d_2 similar in size to d_1, situated internal to dorsointernal carina; d_4 smaller than d_1; d_5 situated distinctly proximal to e_1; e_1 considerably smaller than e_2. Patellar trichobothrium d_2 considerably smaller than d_1; d_3 situated external to dorsomedian carina. Chela trichobothrium Eb_1 smaller than Eb_2 and Eb_3; Eb_1–Eb_3 situated proximally on manus; V_2 larger than, and situated close to V_1; *Est* smaller than *Em* and *Et*, which are similar in size; *esb* smaller than *eb*; *esb* and *eb* situated near base of fixed finger; *db* situated between *est* and *et*; *dt* situated distal to *et*.

Legs: I and II, tibiae and basitarsi each with paired rows of fine, acuminate macrosetae on pro- and retrolateral surfaces. III and IV, tibiae without spurs; basitarsi prolateral pedal spur with one acuminate seta, basal lobe pointed and stout; retrolateral pedal spur asetose. I–IV, telotarsi each with paired

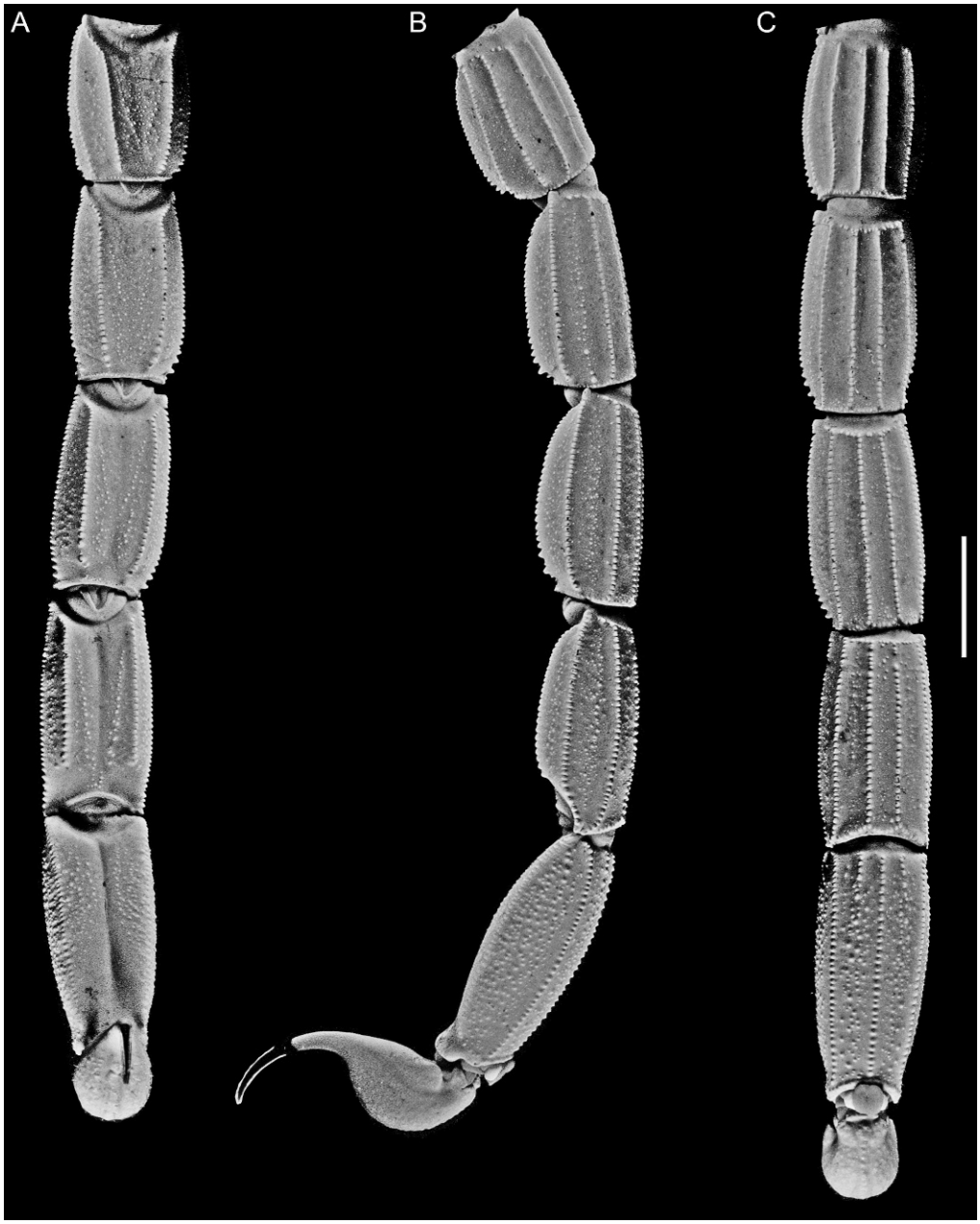

Figure 9.—*Rhopalurus bonettii* Armas 1999, ♂ (AMNH), metasomal segments I–V and telson: A. Dorsal aspect. B. Lateral aspect. C. Ventral aspect. Scale bar = 1 mm.

ventrosubmedian rows of fine, acuminate macrosetae; laterodistal lobes truncated; median dorsal lobes extending to ungues; ungues short, distinctly curved, equal in length.

Mesosoma: Tergites entirely granular, finely on pretergites, coarsely on post-tergites, becoming more so distally; I–VII each with a strongly developed, granular dorsomedian carina; VII additionally with distinct pairs of costate-granular dorsosubmedian and dorsolateral carinae. Sternites III–VI smooth, acarinate, each with pair of narrow, slit-like respiratory spiracles (Figs. 2B, D); III with smooth, raised ridge medially, with stridulatory granules submedially; V with prominent pale, raised surface posteromedially in adult ♂, and 6–10 evenly spaced short, acuminate macrosetae along posterior margin; VII finely granular laterally and medially, with pair of costate-granular ventrosubmedian and ventrolateral carinae.

Metasoma: Segments I–V progressively increasing in length (Fig. 8; Table 1), segment V 51–57% (♂) or 52–59% (♀) longer than segment I; segments stout, width/length segment I, 65–69% (♂) or 69–71% (♀), II, 57–58% (♂) or 55–57% (♀), III, 51–56% (♂) or 51–57% (♀), IV, 51–54% (♂) or 49–52% (♀), and V, 43–44% (♂) or 34–41% (♀). Intercarinal surfaces uniformly finely granular. Segments I–IV, paired dorsosubmedian and dorsolateral carinae continuous, costate-granular, granules gradually becoming larger posteriorly, without associated macrosetae; paired ventrolateral and ventrosubmedian carinae continuous, costate-granular, granules subequal; median lateral carinae continuous, costate-granular, fully developed

Figure 10.—*Rhopalurus princeps* (Karsch 1879), ♂ (AMNH), metasomal segments I–V and telson: A. Dorsal aspect. B. Lateral aspect. C. Ventral aspect. Scale bar = 1 mm.

on segment I, obsolete, granular, restricted to the posterior two-thirds of segment II, absent on segments III–V. Segment V, dorsosubmedian carinae absent; dorsolateral and ventrolateral carinae continuous, costate-granular, granules subequal; ventrosubmedian carinae obsolete, granular, reduced to anterior half of segment; ventromedian carina continuous, costate-granular, granules subequal, without posterior bifurcation.

Telson: Vesicle globose, height/length 52–57%, with flat dorsal surface and rounded ventral surface, slightly compressed anteroventrally (Table 1); slightly narrower than metasomal segment V, width 59–60% (♂) or 63–77% (♀) of segment V. Subaculear tubercle absent (Fig. 8B). Ventrolateral and ventrosubmedian carinae absent; ventromedian carina continuous, granular. Vesicle surfaces with scattered granules, sparse microsetae, and fewer than 16 macrosetae. Aculeus long, 73–80% (♂) to 81–85% (♀) of vesicle length (Table 1), strongly curved.

Male hemispermatophore: Flagelliform, flagellum gradually tapering along its length, folded against shaft (Fig. 11); basal process lobate longitudinally; distal process terminating adjacent to base of flagellum (in dorsal aspect), rib-like and extending longitudinally; distal lobe represented by shelf at base of flagellum; median lobe not developed; internobasal inflection absent; external lobe present, separated from distal process; with small, longitudinally-oriented costate process.

Female reproductive system: Ovariuterine network comprising three longitudinal and ten transverse tubules, forming eight ''cells.''

Geographic variation: The single male specimen from Cabo Flaso is similar to those from the track between Boca de Yuma and Punta Faustino.

Ontogenetic variation: As in other species of *Rhopalurus*, male closely resembles female until the final instar; however, juveniles and subadults may be sexed by examination of the pectines and genital aperture.

Sexual dimorphism: In addition to aforementioned characters, adult males are proportionally longer than adult females. The increased length of the male is attributed mainly to the longer metasomal segments, which sum to 72–78% of the total length of males, but to 69–72% of the total length of females. Adult males are slightly more slender than adult females:

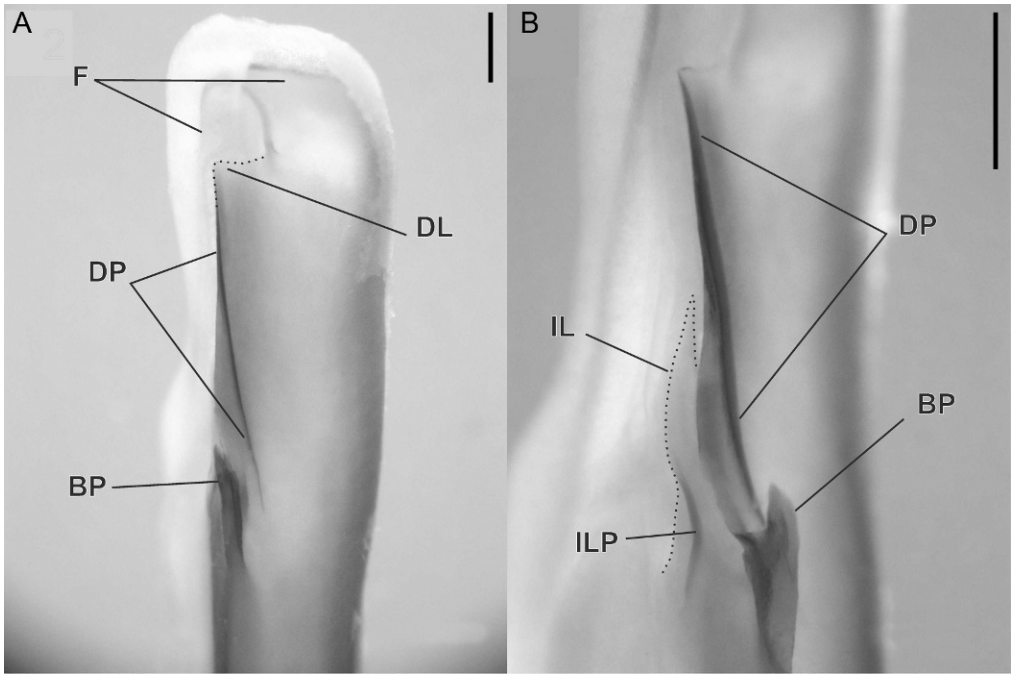

Figure 11.—*Rhopalurus abudi* Armas & Marcano Fondeur 1987, ♂ (AMNH), left hemispermatophore: A. External aspect. B. Anterior aspect (left view rotated right 90° around longitudinal axis). Abbreviations: F, flagellum; DL, distal lobe; DP, distal process; BP, basal process; IL, internal lobe; ILP, internal lobe process. Scale bars = 0.5 mm.

sternite VII length is 37–51% greater than its width in males and 49–53% greater in females (Table 1). The coloration of adult females is similar to but darker than that of adult males.

Distribution.—*Rhopalurus abudi* was described from Catuano, Isla Saona, off the southeast coast of the DR (Armas & Marcano Fondeur 1987). No new records of this species have been reported in the literature since the original description (Armas & Marcano Fondeur 1987; Armas et al. 1999; Teruel 2005, 2006). The records reported here, therefore, represent the first for this species on mainland Hispaniola. Based on published records and those obtained during our expedition, *R. abudi* appears to be restricted to humid coastal forest in the southeast of mainland DR and Isla Saona (Fig. 1). *Rhopalurus princeps* inhabits dry scrub in the central part of Hispaniola, including the valley of the Yaque del Norte River, the Neiba Valley, the Sierra de Baoruco, Sierra de Martín García, and Sierra de Ocoa (Teruel 2006). *Rhopalurus bonettii* is restricted to dry spiny forests south of the Sierra de Baoruco in the western part of mainland DR and Isla Beata, the type locality. The plotted locality data agree with Teruel's (2006: 51, fig. 12) map illustrating the approximate distributions of the three species.

Ecology.—*Rhopalurus abudi* is probably restricted to humid forests, a habitat not previously reported for any *Rhopalurus* species. Although collections were made on the western and eastern sides of Parque Nacional del Este during the course of our expedition, no specimens were found on the western side, which is drier and dominated by dense, spiny forest. Whereas the South American species of *Rhopalurus* appear to be restricted to savannas (Lourenço 1996, 2008), those of the Caribbean are also found in other vegetation zones, including forest (Armas 2001). During our expedition, *R. abudi* was collected in lowland coastal humid forest on limestone, *R. bonettii* in dry spiny forests on limestone, and *R. princeps* in dry scrub on mixed substrata. All specimens of *R. abudi* were collected at night using UV light detection. None were found during the day, unlike *R. bonettii*, which was commonly found sheltering between slabs of rock (though never under bark or wood), and *R. princeps*, which was found under bark, wood and stones, as well as in dead and dry agave plants. The holotype of *R. abudi* was collected from under a stone (Armas & Marcano Fondeur 1987).

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Appendix 1. Currently recognized species and subspecies of *Rhopalurus* Thorell 1876 and related genera, with countries, departments (Colombia, Haiti), provinces (Cuba, Dominican Republic), regions (French Guiana) and states (Brazil, Venezuela) of known distribution (data from González-Sponga 1996; Fet & Lowe 2000; Flórez 2001; Teruel 2006; Teruel & Roncallo 2008; Teruel & Tietz 2008; Lourenço 2008; this study). New records reported in this study are marked with an asterisk.

***Physoctonus debilis* (C.L. Koch 1840):** Brazil (Bahia, Ceará, Pernambuco*, Piauí). This species was originally placed in the non-buthid genus *Vaejovis* C.L. Koch 1836. It was transferred to *Rhopalurus* by Borelli (1910) and remained there until Lourenço (2002) resurrected the genus *Physoctonus* Mello-Leitão 1934, earlier synonymized with *Rhopalurus* by Francke (1977).

***Rhopalurus abudi* Armas & Marcano Fondeur 1987:** Dominican Republic (La Altagracia, La Romana).

***Rhopalurus acromelas* Lutz & Mello 1922:** Brazil (Bahia, Ceará, Tocantins, Maranhão*, Pernambuco, Piauí).

***Rhopalurus agamemnon* (C.L. Koch 1839):** Brazil (Bahia, Ceará, Tocantins, Mato Grosso, Pernambuco, Piauí).

***Rhopalurus amazonicus* Lourenço 1986:** Brazil (Pará).

***Rhopalurus bonettii* Armas 1999:** Dominican Republic (Pedernales).

***Rhopalurus caribensis* Teruel & Roncallo 2008:** Colombia (Atlántico, La Guajira, Magdalena), Venezuela (Zulia). Lourenço (2008) suggested that this species might be more appropriately recognized as a subspecies of *Rhopalurus laticauda* Thorell 1876.

***Rhopalurus crassicauda* Caporiacco 1947:** Brazil (Amazonas*, Roraima), Guyana. This species was synonymized with *Rhopalurus pintoi* Mello-Leitão 1933 by Lourenço (1982) and reinstated by Lourenço (2002). Teruel & Tietz (2008) demonstrated that *R. pintoi* is a distinct species but questioned whether *R. crassicauda* can be regarded as distinct from *R. laticauda*. In our opinion, *R. crassicauda* is probably a junior synonym of *R. laticauda*. Lourenço (2008) rejected the suggestion that *R. crassicauda* may be synonymous with *R. laticauda*, suggesting instead that it might be a subspecies of the latter. Lourenço (2008) also created two new subspecies of *R. crassicauda*. The distinction between *R. laticauda*, *R. crassicauda* and its two subspecies warrants further investigation.

***Rhopalurus crassicauda kourouensis* Lourenço 2008:** French Guiana (Kourou).

***Rhopalurus crassicauda paruensis* Lourenço 2008:** Brazil (Pará).

***Rhopalurus garridoi* Armas 1974:** Cuba (Guantanamo).

***Rhopalurus gibarae* Teruel 2006:** Cuba (Holguín).

***Rhopalurus granulimanus* Teruel 2006:** Cuba (Holguín).

***Rhopalurus guanambiensis* Lenarducci, et al. 2005:** Brazil (Bahia).

***Rhopalurus junceus* (Herbst 1800):** Cuba (Camaguey, Cienfuegos, Ciego de Avila, Granma, Guantanamo, Havana, Holguín, Isla de la Juventud, Las Tunas, Matanzas, Pinar del Rio, Santiago de Cuba, Sancti Spiritus, Villa Clara). Records of this species from Haiti and Venezuela (see, e.g. Fet & Lowe 2000: 220) are probably erroneous (Armas 2001:248).

***Rhopalurus lacrau* Lourenço & Pinto-da-Rocha 1997:** Brazil (Bahia).

***Rhopalurus laticauda* Thorell 1876:** Colombia (Arauca, Boyacá, Casanare, Cesar, Meta, La Guajira, Magdalena, Norte de Santander, Vichada), Venezuela (Amazonas, Anzoátegui, Apure, Aragua, Barinas, Bolívar, Carabobo, Cojedes, D.F., Falcon, Guárico, Lara, Mérida, Miranda, Monagas, Nueva Esparta, Portuguesa, Sucre, Táchira, Vargas, Yaracuy, Zulia).

***Rhopalurus melloleitaoi* Teruel & Armas 2006:** Cuba (Granma).

***Rhopalurus pintoi* Mello-Leitão 1933:** Brazil (Roraima), Guyana, ?Venezuela (Bolívar). This species was relegated to a subspecies of *R. laticauda* by Lourenço (1982) until reinstated by Lourenço (2002). Teruel (2006) suggested that it might be a senior synonym of *Rhopalurus piceus* Lourenço & Pinto-da-Rocha 1997 and this was confirmed by Teruel & Tietz (2008). Lourenço (2008) agreed with the recognition of *R. pintoi* as a distinct species, but suggested that *R. piceus* may yet prove to be valid. We agree with the decision of Teruel & Tietz (2008).

***Rhopalurus princeps* (Karsch 1879):** Dominican Republic (Azua, Barahona, Baoruco, Independencia, Montecristi, Pedernales, Peravia), Haiti (Département du l'Ouest). Records of this species from Cuba (listed by Fet & Lowe 2000:221) are erroneous.

***Rhopalurus rochae* Borelli 1910:** Brazil (Bahia, Ceará, Paraíba, Pernambuco, Piauí, Rio Grande de Norte, Sergipe*). Borelli (1910) named the species after Francisco Diaz da Rocha, but his original spelling was *rochae*. Fet & Lowe (2000) noted that the correct spelling is *rochai* and changed it accordingly. Although the corrected spelling has been adopted by others (e.g., Teruel 2006:52), we use Borelli's (1910) original spelling.

***Troglorhopalurus translucidus* Lourenço, et al. 2004:** Brazil (Bahia). In our opinion, this monotypic genus is a junior synonym of *Rhopalurus*. As twice noted by Lourenço et al. (2004:1153, 1156), when comparing *Troglorhopalurus* with *Rhopalurus*: "It may be that all modifications presented by the new troglobitic scorpion are the result of adaptation to a cave dwelling life."

Appendix 2. Material examined for comparison with *Rhopalurus abudi* Armas & Marcano Fondeur, 1987. Specimens are deposited in the following collections: American Museum of Natural History (AMNH), New York, USA, incorporating the Alexis Harington (AH) Collection; Natur-Museum Senckenberg, Frankfurt (SMF), Germany; Zoologisches Museum der Humboldt-Universität, Berlin (ZMB), Germany; Zoologisches Museum der Universität Hamburg (ZMH), Germany. Reference numbers (ESV and LP), provided on labels with the specimens, correspond to entries in the specimen databases of the author with the corresponding initials.

***Physoctonus debilis* (C.L. Koch, 1840):** BRAZIL: *Pernambuco*: Exu, 5 km N, 4 October 1977, L.J. Vitt, 1 ♀ (AMNH), 18 January 1978, L.J. Vitt & K.E. Streilein, 1 ♀ (AMNH); Exu, 18 km N, 5 March 1977, L.J. Vitt, under leaf of granite on boulder, caatinga habitat, 1 ♀ (AMNH); Fazenda Batente, 13 km E Exu, 10 November 1977, L.J. Vitt & K.E. Streilein, 1 ♀ (AMNH); Fazenda Caterino, 10 km NE Exu, 9 July 1977, L.J. Vitt, 1 ♀ (AMNH), 25 September 1977, L.J. Vitt, 1 ♀ (AMNH).

***Rhopalurus acromelas* Lutz & Mello, 1922:** BRAZIL: *Maranhão*: Municipio de Loreto: Santa Barbara, on shore of Rio Parnoiba, June 1962, G. Eiten, 1 ♂ (AMNH). *Pernambuco*: Exu, 10 km N, 13 March

1977, L.J. Vitt, rocky habitat within thorn scrub forest, 1 ♀, 1 subad. ♀, 4 juv. (AMNH), 14 March 1977, L.J. Vitt, rocky habitat in thorn scrub, 1 ♂, 1 ♀ (AMNH [ESV7532]); Exu, 10 km NE, 28 April 1977, L.J. Vitt, 1 ♂, 1 ♀, 2 subad. ♀, 2 subad., 1 juv. (AMNH), 25 September 1977, L.J. Vitt, 1 ♂, 1 ♀ (AMNH [ESV7244]); Exu, 15 km NE, 14 May 1977, L.J. Vitt, high caatinga, under bark of tree, 1 subad. ♀ (AMNH); Exu, 20 km E, 30 March 1977, L.J. Vitt, 1 juv. ♂ (AMNH); Fazenda Caterino, 10 km NE Exu, 9 July 1977, L.J. Vitt, 1 subad. ♂ (AMNH), 1 August 1977, L.J. Vitt, 1 juv. ♂ (AMNH).

***Rhopalurus agamemnon* (Herbst, 1800):** BRAZIL: *Bahia*: Salvador, February 1972, Weinkselbaum, 1 ♀ (AMNH [ESV7405]).

***Rhopalurus bonettii* Armas, 1999:** DOMINICAN REPUBLIC: *Pedernales Province*: Parque National Jaragua: Cabo Rojo, 17°53′45.2″N, 71°39′35.8″W, 9 July 2004, E.S. Volschenk & J. Huff, 15 m, dry cactus and spiny forest on limestone karst, hand collected at night with blacklights, 3 ♂, 10 ♀, 4 subad., 2 juv. (AMNH [ESV6005]), 1 ♂ (AMNH [ESV7126]), 1 ♂, 1 ♀ (AMNH [ESV7127]), 1 subad. ♂ (AMNH), 1 juv. ♂ (AMNH [LP 3267]); Road to Fondo Paradi, 1.8 km from Highway 44, 17°48.692′N, 71°26.600′W, 12 January 2004, J. Huff, 302 ft, found between rocks, 1 ♀ (AMNH [LP 2471]), 1 ♀ (AMNH [LP 3265]); Track into park, between Manuell Goa and Oviedo, 17°48′41.5″N, 71°26′35.9″W, 9 July 2004, E.S. Volschenk & J. Huff, 83.3 m, deciduous forest and thorny scrub, hand collected from between stones during the day and with blacklights at night, 13 ♂, 7 ♀, 1 subad., 1 juv. (AMNH [ESV6011]), 1 ♂, 1 ♀ (AMNH [ESV7112]), 1 ♂ (AMNH [ESV7129]), 1 juv. (AMNH [LP 3266]).

***Rhopalurus caribensis* Teruel & Roncallo, 2008:** COLOMBIA: *Magdalena Department*: Bahia de Guairaca, Tayrona Park, 31 October 1985, H.-G. Muller, 1 ♀ (SMF 37027); Pozo Colorado, 11 km W Santa Marta, 18–30 April 1968, B. Malkin, 1 ♀, 1 subad., 19 first instars (AMNH); Puente de Los Clavos, 15 km E Pueblo Bello, Sierra Nevada de Santa Marta, 13 June 1968, B. Malkin, 1500 m, 1 subad. ♀ (AMNH); Santa Marta, 29 June–31 July 1966, 2 ♀ (SMF 39120).

***Rhopalurus crassicauda* Caporiacco, 1947:** BRAZIL: *Amazonas*: Rio Branco, Amazonasgebiet, 1912, E. Ule, 1 juv. ♀ (ZMB 14867). *Roraima*: Mt. Roraima, 2 ♂, 1 ♀, 1 subad. (AMNH 29180).

***Rhopalurus junceus* (Herbst, 1800):** CUBA: July 2007, C. Hamilton, 1 juv. (AMNH [LP 7009]); 'Antillen?,' 1 ♂, 2 ♀ (ZMB 7370); 'Portorico', Stahl, 2 ♀, 1 juv. (ZMB 7280 [ESV7001]); Gundlach, 2 ♀ (ZMB 2637), 1 ♂, 1 ♀ (ZMB 7380 [ESV7224]), 1 juv. (ZMB, 7343); Arroyo Bermejo, near Fibacoa, 31 May 1967, Kleiderschrank, 1 ♂ (ZMB 31020), 15 June 1967, im zelt. wiese auf sandboden, 1 ♀ (ZMB 31021), June 1967, 1 juv. (ZMB 31022); 1 ♂ (ZMH), Santiago de las Caballeros, P. Thumb, 1936. *Havana Province*: Havana, 1 ♀ (AMNH), April 1941, Dr E. Weiss, 1 ♀, 1 subad. (AMNH). *Holguín Province*: August 2000, Heist, captive bred, 1 juv. (AMNH [LP 1928]); near Baños [Banes], May 1918, 2 ♂ (AMNH); Guardalavaca, 29 March 1993, W. Altmann, captive bred, 1 ♂ (AMNH [LP 1565]); Mountains near Guisa, October 1936, P. Thumb, 1 ♀, 28 juv. (ZMH); Moa, September 1937, P. Thumb, 1 ♂ (ZMH), 1938, P. Thumb, 4 ♀ (ZMH). *Isla de la Juventud Province*: Isle of Pines, 1 ♂ (AMNH). *Pinar del Rio Province*: Guanahacabiles, Akad.-stat. El Beral, December 1967, G. Peters, 1 subad. (ZMB 31023); Sierra de Anafe, 23 February 1947, M. Barro, 2 subad. (AMNH); Vinales Valley, 1940, Osorio, 1 ♀ (AMNH). *Santiago de Cuba Province*: La Socapa, 10 km SW of Santiago de Cuba, 9 April 1999, R. Teruel, 1 ♂ (AMNH), 1 ♀ (AMNH [LP 1509]), 1 juv. ♀ (AMNH [LP 1517]), 1 ♀ (AMNH [LP 1518]); Santiago de Cuba, 1 ♂, 2 juv. (AMNH). *Sancti Spiritus Province*: Trinidad, August 1978, B. Acosta, 1 ♂ (AMNH AH 4514 [ESV7041]).

***Rhopalurus lacrau* Lourenço & Pinto-da-Rocha, 1997:** BRAZIL: *Bahia*: Município Itaeté: Trail between Caves ''Lapa do Bode'' and ''Lapa Escondida,'' 12°56′9.1″S, 41°3′56.2″W, 21 January 2007, C.I. Mattoni, R. Pinto-da-Rocha & H. Yamaguti, under rocks, 2 ♀ (AMNH), 1 subad. ♀, 4 juv. (AMNH [LP 7637]).

***Rhopalurus laticauda* Thorell, 1876:** 2 ♀ (ZMB 14865); ''Mexico,'': Dr v. Hubl, 1 ♂ (ZMB 14866). VENEZUELA: F. Kummerow, 1 ♂, 1 ♀ (ZMB 8226). San Jose de Guaviare, December 1955, Meden, 1 ♀ (SMF 39252). *Aragua*: Maracay, 1 subad. ♂ (SMF 29208), Fahrenholz, 1 ♂, 1 ♀, 1 subad. (SMF 8876/218). *Bolívar*: Ciudad Bolivar, 20 February 1903, 2 ♀ (ZMH); La Paragua, M.A. de Verde, 1 ♂ (AMNH); Upata, February 1973, A. Bordes, 1 ♀ (AMNH). *Carabobo*: Valencia, F. Kummerow, 29 December 1904, 1 ♀ (ZMB 31024), September 1958, H. Ardelt, 2 ♀ (ZMH). *Distrito Federal*: Caracas, March 1999, C. Siederman, 2 ♀, 20 first instars (AMNH [ESV7444]), 2001, C. Siederman, 1 ♂ (AMNH [LP 2462]). *Guarico*: Calabozo and San Fernando de Apure (about halfway between), 30 November 1967, M.A. de Verde, 1 ♀ (AMNH); 'Hato Masaguarat,' 45 km S Calabozo, 7 April 1978, Y. Lubin, 1 ♂ (AMNH [ESV7816]). *Mérida*: Mérida, 2 ♂, 3 ♀ (SMF 5712/27). *Miranda*: Guatire, 29 April 2004, R.C. West, under rocks, dry forest, 1 ♂ (AMNH [LP 2845]), 1 ♀ (AMNH); Hda. Santa Rosa, 3 km N Guatire, 10 January 1973, M.A. González-Sponga, 450 m, 1 ♂, 1 ♀, 2 juv. (AMNH). *Nueva Esparta*: Isla Margarita, N of Peninsula de Macanao, 11°02.618′N, 64°21.542′E, 4 September 2005, S. Huber, 1 ♀ (AMNH [LP 4221]). *Trujillo*: Valera region, N, October 2005, S.E. Bazo Abreu, 1 ♀ (AMNH [LP 5504]), 1 ♀ (AMNH [LP 5505]).

***Rhopalurus pintoi* Mello-Leitão, 1933:** GUYANA: *Roraima Province*: Rununui region, SW Guyana, near Venezuelan border, ex A. Tietz, March 2008, 1 juv. ♂ (AMNH [LP 8278]).

***Rhopalurus princeps* (Karsch, 1879):** DOMINICAN REPUBLIC: *Independencia Province*: Isla Cabritos, 18°30.019′N, 71°43.228′W, 7 January 2004, J. Huff, 110 ft, under rock, coral, 1 ♂, 1 ♀, 16 juv. (AMNH), 5 ♂, 3 ♀, 3 subad., 1 juv. (AMNH), 3 juv. (AMNH [LP 2470]), 1 subad., 2 juv. (AMNH [LP 3260]); Ranger station for Parque Nacional Isla Cabritos, 18°33′45″N, 71°41′50″W, 8 July 2004, E.S. Volschenk & J. Huff, −19 m, dry forest, hand collected from under stones and logs, and with blacklights, 3 ♂, 7 ♀, 5 subad., 2 juv. (AMNH [ESV6006]), 1 subad. ♂ (AMNH), 1 subad. (AMNH [LP 3264]); Parque Nacional Isla Cabritos, behind Ranger Station, 18.56287°N, 71.69762°W, 8 August 2005, L. Esposito, −23 m, mixed dry forest with succulents, UV detection, 35°C, 2 ♂, 8 ♀, 1 subad. ♀, 32 first instars (AMNH), 2 ♂, 1 subad. ♀ (AMNH), 1 ♂ (AMNH [LP 5102]); Parque Nacional Sierra de Baoruco, road between Rabo de Gato and Duverge, 18°19′38″N, 17°33′55″W, 7 July 2004, E.S. Volschenk & J. Huff, 447 m, arid thorny scrub, hand collected from under stones and in dead and dry agaves, 3 ♂, 3 ♀, 3 juv. (AMNH [ESV6033]), 1 juv. (AMNH), 1 ♀ (AMNH [LP 3263]); Puerto Escondido, Sierra de Baoruco, 18°19.762′N, 71°33.502′W, 6 January 2004, J. Huff, 1592 ft, under dead agave, 1 ♂, 3 ♀, 1 juv. (AMNH), 1 juv. (AMNH [LP 3261]); Road to Puerto Escondido, 18°20.376′N, 71°33.345′W, 6 January 2004, J. Huff, 1388 ft, under rocks in gravel quarry, 1 ♀ (AMNH), 1 juv. (AMNH [LP 3262]). *Pedernales Province*: Manuel Goja, 3.9. km N, 9 May 1998, D. Huber, 1 ♂ (AMNH [LP 1566]); Oviedo to Pedernales, 11.5 km N, 8 May 1998, D. Huber, 1 ♂ (AMNH [LP 1516]). HAITI: *Departement de l'Ouest*: Port-au-Prince, Ehrenberg, holotype ♂ (ZMB 116).

***Rhopalurus rochae* Borelli, 1910:** BRAZIL: *Bahia*: Município Ceraíma: Guanambí, 7 km S, 14°17′5.6″S, 42°47′2.2″W, 24 January 2007, C. Mattoni, R. Pinto-da-Rocha & H. Yamaguti, 533 m, UV sampling, modified savanna, cloudy and raining, 1 juv. (AMNH [LP 7638]); Fazenda du Fabiano, 8 km NE Guanambí, 14°10′17.6″S, 42°43′56.4″W, 24 January 2007, C. Mattoni, R. Pinto-da-Rocha & H. Yamaguti, 539 m, under rocks, rocky hill and surrounds, open savanna modified, 1 ♂, 2 juv. (AMNH [LP 7639]), 1 ♀ (AMNH); Guanambí, 16 km SE, 14°17′19″S, 42°41′31.1″W, 25 January 2007, C. Mattoni, R. Pinto-da-Rocha, H. Yamaguti, 559 m, UV sampling and under leaf litter, banana plantation and surrounds, 1 juv. (AMNH [LP 7655]). *Paraíba*: Soledade, 07°02.118′S, 36°27.311′W, 16 March 1999, A. Kury & A. Giupponi, 575 m, 1 ♂ (AMNH [LP 1581]), 1 ♀ (AMNH [LP 1582]), 1 ♂ (AMNH [LP 1775]). *Pernambuco*: Escola

Aquicola, Exu, 30 March 1977, L.J. Vitt, caatinga, 1 ♂ (AMNH [ESV7248]), 27 June 1977, L.J. Vitt, 1 ♂ (AMNH); Exu, 3 km NW, 10 March 1977, L.J. Vitt, 2 ♂, 1 ♀, 3 juv. (AMNH); Exu, 3 km W, 30 May 1977, L.J. Vitt, 2 ♂, 4 ♀, 4 juv. (AMNH), 1 June 1977, L.J. Vitt, 1 ♀ (AMNH); Exu, 5 km N, 6 April 1977, L.J. Vitt, caatinga, 1 ♂, 1 juv. (AMNH), 18 January 1978, L.J. Vitt & K.E. Streilein, 1 juv. (AMNH); Exu, 5 km E, 8 May 1977, L.J. Vitt, 1 juv. (AMNH); Exu, 6 km N, 15 March 1977, L.J. Vitt, open fields (cotton), under fallen logs, 1 ♀, 1 juv. ♂ (AMNH); Exu, 6 km NE, 16 March 1977, L.J. Vitt, under rock on larger rock, caatinga habitat, 1 ♀, 49 first instars (AMNH); Exu, 18 km E, 5 March 1977, L.J. Vitt, under leaf of granite on boulder, caatinga habitat, 1 ♀, 29 first instars (AMNH), 1 ♀, 39 first instars (AMNH [ESV7210]); Exu, 20 km E, 30 March 1977, J.L.Vitt, 1 ♂, 1 ♀ (AMNH [ESV7625]); Fazenda Batente, 5 km NE Exu, 29 March 1977, L.J. Vitt, 1 juv. (AMNH); Fazenda Caterino, 10 km NE Exu, 1 August 1977, L.J. Vitt, 2 ♂, 3 juv. (AMNH), 5 ♂, 3 ♀ (AMNH); Fazenda Chelonia, 8 km S Exu, 28 July 1977, L.J. Vitt, 2 juv. (AMNH); Fazenda Guarani, 3 km N Exu, 14 July 1977, L.J. Vitt, 1 ♂, 3 ♀, 1 subad. 3 juv. (AMNH); Fazenda Guarani, 5 km N Exu, 29 July 1977, L.J. Vitt, 1 ♀, 3 juv. (AMNH), 19 February 1978, L.J. Vitt, 1 ♀ (AMNH). *Sergipe*: Municipio Lagarto: near Genipapo, July 1982, O.F. Francke, 1 ♂, 2 ♀ (AMNH).