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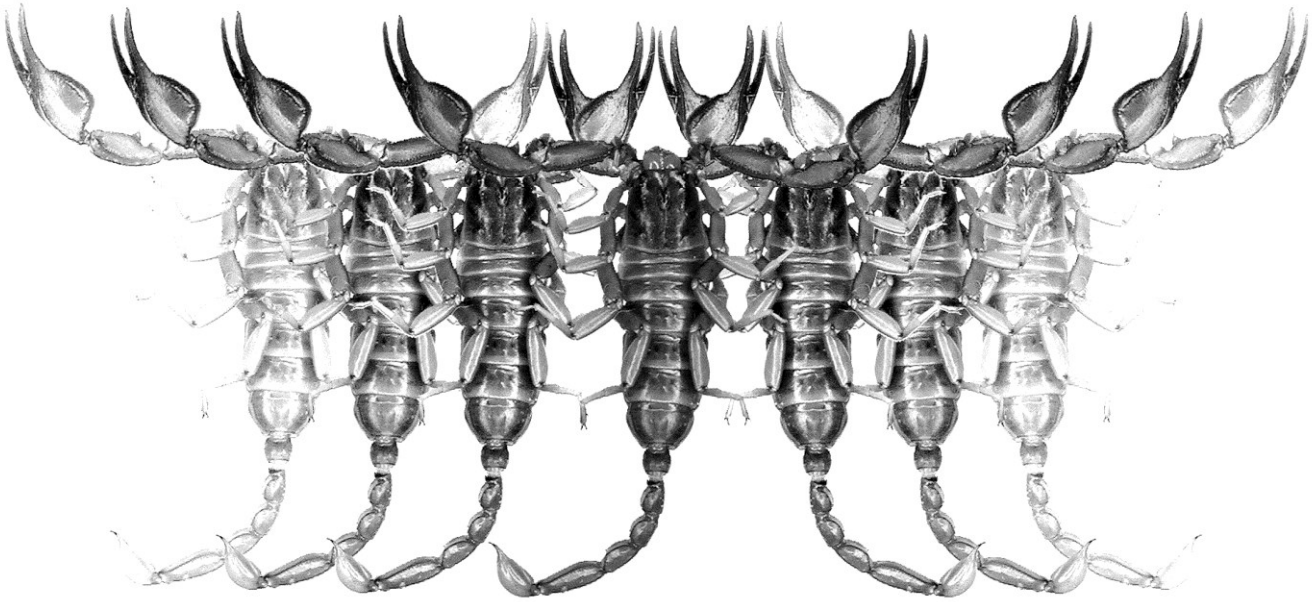

A New Species of *Centruroides* Marx, 1890 (Scorpiones: Buthidae) from Southern Hispaniola, Greater Antilles

Rolando Teruel, Luis F. de Armas & František Kovařík

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A new species of *Centruroides* Marx, 1890 (Scorpiones: Buthidae) from southern Hispaniola, Greater Antilles

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http://zoobank.org/urn:lsid:zoobank.org:pub:A9F877AB-5905-4426-819D-412187BC68D3

Summary

We describe herein a new species of buthid scorpions, *Centruroides lucidus* **sp. n.**, from southwestern Dominican Republic (Pedernales and Barahona Provinces), in the Greater Antillean island of Hispaniola. It is most similar to *Centruroides nitidus* (Thorell, 1876) and *Centruroides bani* Armas & Marcano, 1987 (both of which occur together with it along the same general area), against which a very detailed comparison is provided. The new species is fully illustrated with color photos of habitus, key diagnostic morphological characters, and habitat.

Introduction

The genus *Centruroides* Marx, 1890 (Scorpiones: Buthidae) is a widespread and locally dominant faunistic element all over its native range, which extends on the American mainland from southern U.S.A. through northern Peru as well as Caribbean islands (Fet & Lowe, 2000; Armas et al., 2011). This genus obviously has long attracted the interest of specialists and in taxonomy alone, new species have been continuously described essentially every decade for more than a century.

In the Greater Antillean island of Hispaniola, an adequate picture of *Centruroides* diversity can be gathered, mostly due to the important contributions published during the last 30 years (Armas, 1976, 1981, 1988, 1999, 2001, 2002; Armas & Marcano Fondeur, 1987, 1992; Armas et al., 1999, 2011b; Teruel, 2005). From these sources, the number of species confirmed to occur in the island is five: *Centruroides alayoni* Armas, 1999, *C. bani* Armas et Marcano Fondeur, 1987, *C. jaragua* Armas, 1999, *C. marcanoi* Armas, 1981, and *C. nitidus* (Thorell, 1876). All of these species are currently regarded as endemics of this island and are monotypic. [In using this term, rarely applied in scorpion taxonomy, we follow Mayr (1969: 37), who defined species that contain two or more subspecies as polytypic, and species that are not subdivided into subspecies as monotypic].

Three additional species correspond to questionable and/or erroneous records, and thus have been excluded from the list above. *Centruroides margaritatus* (Gervais, 1841) was recorded by Armas (1981) from "Santo Domingo", but later Armas et al. (2011b) regarded this record as a wrong label interpretation, the correct origin of the sample being a homonymous town located in Heredia Province, Costa Rica. Two other enigmatic species, *Centruroides tenuis* (Thorell, 1876) and *C. zayasi* Armas, 1976, were described from Hispaniola, but their taxonomic status and validity have remained controversial for many years (Armas, 1981, 2001; Armas & Marcano Fondeur, 1987; Armas et al., 1999; Fet & Lowe, 2000; Teruel, 2005). Moreover, the fossil species *Centruroides beynai* was described from the Dominican Republic amber by Schawaller (1979), but its true taxonomic status remains controversial as it could be a synonym of an extant species (Armas, 1988; Fet & Lowe, 2000).

Herein we described a new species from the southern Dominican Republic (Pedernales and Barahona Provinces, but most likely occurring also in neighboring Haiti), which was first misidentified as *C. tenuis* by Armas et al. (1999), but later correctly recognized as a separate, undescribed taxon independently by Armas (2001) and Teruel (2005). With the single exception of two males, the type series consists entirely of specimens captured personally by the authors during multiple expe-

ditions to the Dominican Republic, which allowed us to gather important supplementary information about its ecology.

Methods & Material

Nomenclature and measurements follow Stahnke (1971), Kovařík (2009), and Kovařík & Ojanguren Affilastro (2013), except for trichobothriotaxy (Vachon, 1974), metasomal carinae (Francke, 1977), pedipalp chela carinae (Acosta et al., 2008, as interpreted by Armas et al., 2011a), and sternum (Soleglad & Fet, 2003).

Specimens studied herein are preserved in ethanol 80% and deposited in the personal collections of the authors, to which the following name-based abbreviations have been applied: IES, Instituto de Ecología y Sistemática, Havana, Cuba; RTO, the first author's collection, FKCP, the last author's collection. In the first two cases, both collecting and identification labels were originally written in Spanish, but have been translated here into English for text coherence.

Systematics

Family Buthidae C. L. Koch, 1837

Centruroides lucidus Teruel, Armas et Kovařík, **sp. n.**

(Figures 1–35; Tables 1–5)

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Centruroides nitidus: Armas & Marcano Fondeur, 1992: 35. Armas, 2002: 65 [misidentification: specimens from Los Tres Charcos and possibly also from Cabral-Polo road].
Centruroides tenuis: Armas et al., 1999: 31 [misidentification].
Centruroides sp.: Armas, 1999: 124. Armas & Abud, 2004: 59. Teruel, 2005: 168–175; figs. 7, 26.
"Misidentified specimens": Armas, 2001: 247 [from Beata Island and south Pedernales].

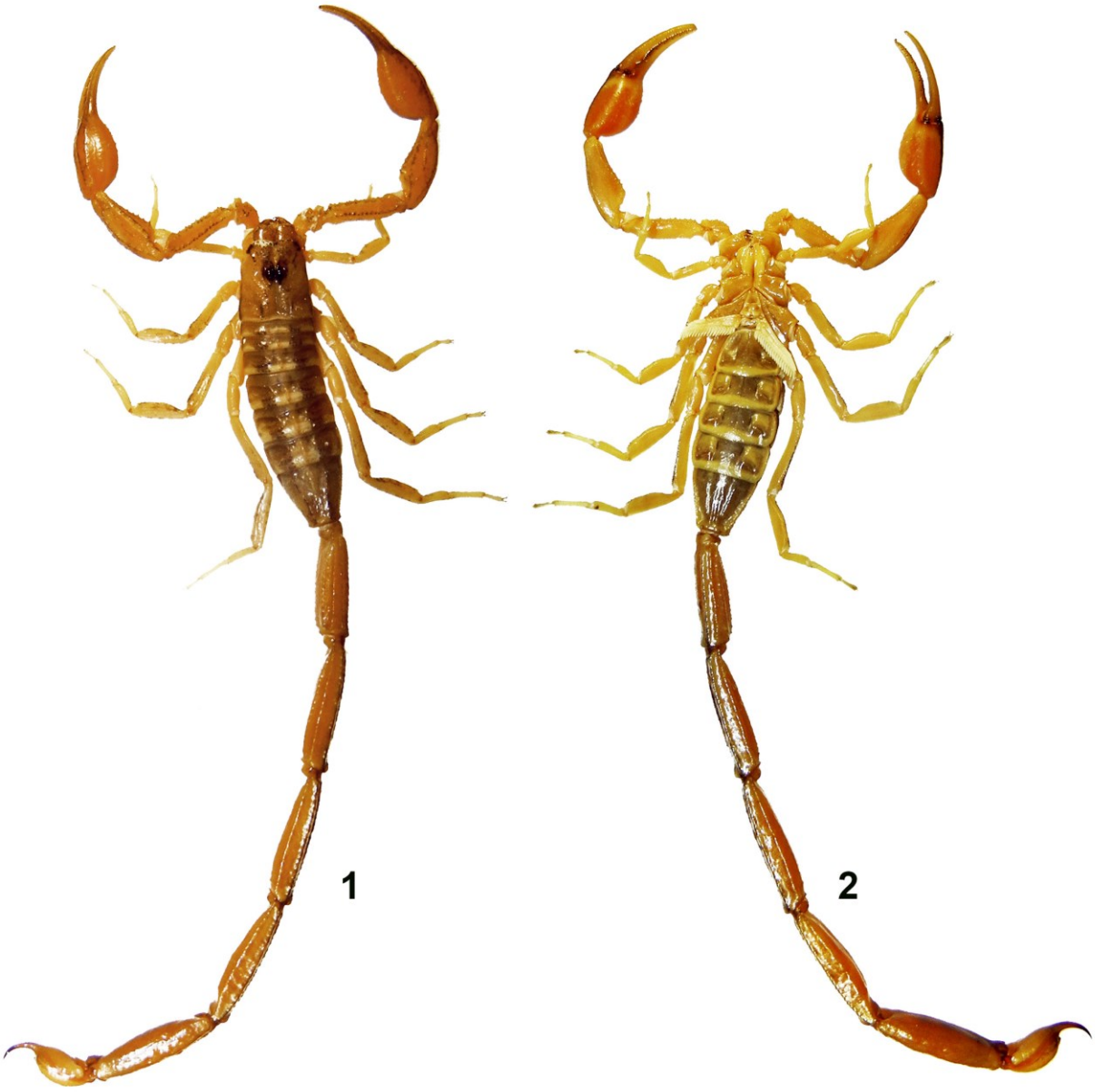
HOLOTYPE. ♂ (RTO). DOMINICAN REPUBLIC: ***Pedernales Province***, Oviedo, Los Tres Charcos, 17°49'10.3"N - 71°26'15.1"W, 71 m a.s.l., under bark in dry semicaducifolious forest on karstic soil, 12 March 2014, leg. R. Teruel, F. Kovařík, P. Kindl.

PARATYPES (53 specimens: 18♂♂, 19♀♀, 16 juveniles). DOMINICAN REPUBLIC: ***Pedernales Province***, Pedernales, end of town on road to Oviedo, 18°02'07"N - 71°44'24"W, 5 m a.s.l., under bark in secondary vegetation, 1 February 2005, leg. R. Teruel, A. Fong, D. Maceira, A. Sánchez, 1♂, 2♀♀, 4 juveniles (RTO: Sco-0284). Sabana de Sansón, km 17 of road from Oviedo to Pedernales, 17°53'17.4"N 71°29'52.1 "W, 123 m a.s.l., under bark and inside dry cacti in transition from dry semicaducifolious forest through semidesertic scrub on karstic soil, 12 and 14 March 2014, leg. R. Teruel, F. Kovařík, P. Kindl, 3♂♂, 2♀♀, 3 juveniles (RTO), 1♂ (FKCP); Oviedo, Los Tres Charcos, 17°49'10.3"N 71°26'15.1"W, 71 m a.s.l. [type locality], under bark in dry semicaducifolious forest on karstic soil, 21 August 1987, leg. L. F. de Armas, E. J. Marcano, A. Abud, D. Lantigua, 2♀♀ (IES), 12 March 2014, leg. R. Teruel, F. Kovařík, P. Kindl, 4♂♂, 9♀♀, 6 juveniles (RTO), 5♂♂, 3♀♀, 1 juvenile (FKCP); Los Tres Charcos, no other data, 1♂ (RTO: Sco-0518); Oviedo, Fondo Paradí, 4 km south of Los Tres Charcos, 17°45'15"N 71°24'01"W, 50 m a.s.l., under bark in dry semicaducifolious forest on karstic soil, 1 February 2005, leg. R. Teruel, A. Fong, D. Maceira, A. Sánchez, 2♂♂, 1♀, 2 juveniles (RTO: Sco-0285); Isla Beata, Punta Lanza, La Playita, under bark of tree stump in dry semicaducifolious forest on karstic soil, 28 February 1988, leg. J. A. Ottenwalder, 1♂ (IES).

ADDITIONAL MATERIAL (not types, 17 specimens: 7♂♂, 6♀♀, 4 juveniles). DOMINICAN REPUBLIC: **Barahona Province**, Sierra de Bahoruco, Cabral, km 7–9 of road from Cabral to Polo, 18°10'55"N 71°15'10"W, 221 m a.s.l., under bark in semicaducifolious forest on karstic soil, 23 August 1987, leg. L. F. de Armas, E. J. Marcano, A. Abud, D. Lantigua, 1♂ (IES), 7–8 March 2014, leg. R. Teruel, F. Kovařík, P. Kindl, 2♂♂, 2♀♀, 1 juvenile (RTO), 4♂♂, 1♀ (FKCP); Sierra de Bahoruco, 5 km north of Maniel Viejo, on dirty road from Polo to Enriquillo, 17°59'54.6"N 71°18'58.4"W, 504 m a.s.l., under bark in secondary forest on karstic soil, 8 March 2014, leg. R. Teruel, F. Kovařík, P. Kindl, 3♀♀, 3 juveniles (FKCP).

ETYMOLOGY. The selected epithet is a Latin adjective that literally means "light, bright, and shiny". It alludes to the characteristic combination of pale and shiny appearance of this species.

DIAGNOSIS. Adult size medium to moderately large for the genus (50–76 mm in males, 44–59 mm in females). Coloration basically light yellow to pale yellowish-brown, very sparsely spotted with grayish to medium brown all over the body and appendages; carapace predominantly pale, with irregularly defined dark interocular triangle, tergites with two irregular, narrow dark stripes; pedipalp chelae with fingers slightly to moderately darker than manus. Pedipalps large, robust, and essentially bare; manus stout oval (length/width ratio 1.58–1.78 in males, 1.33–1.51 in females), with carinae obsolete to vestigial, weakly co-

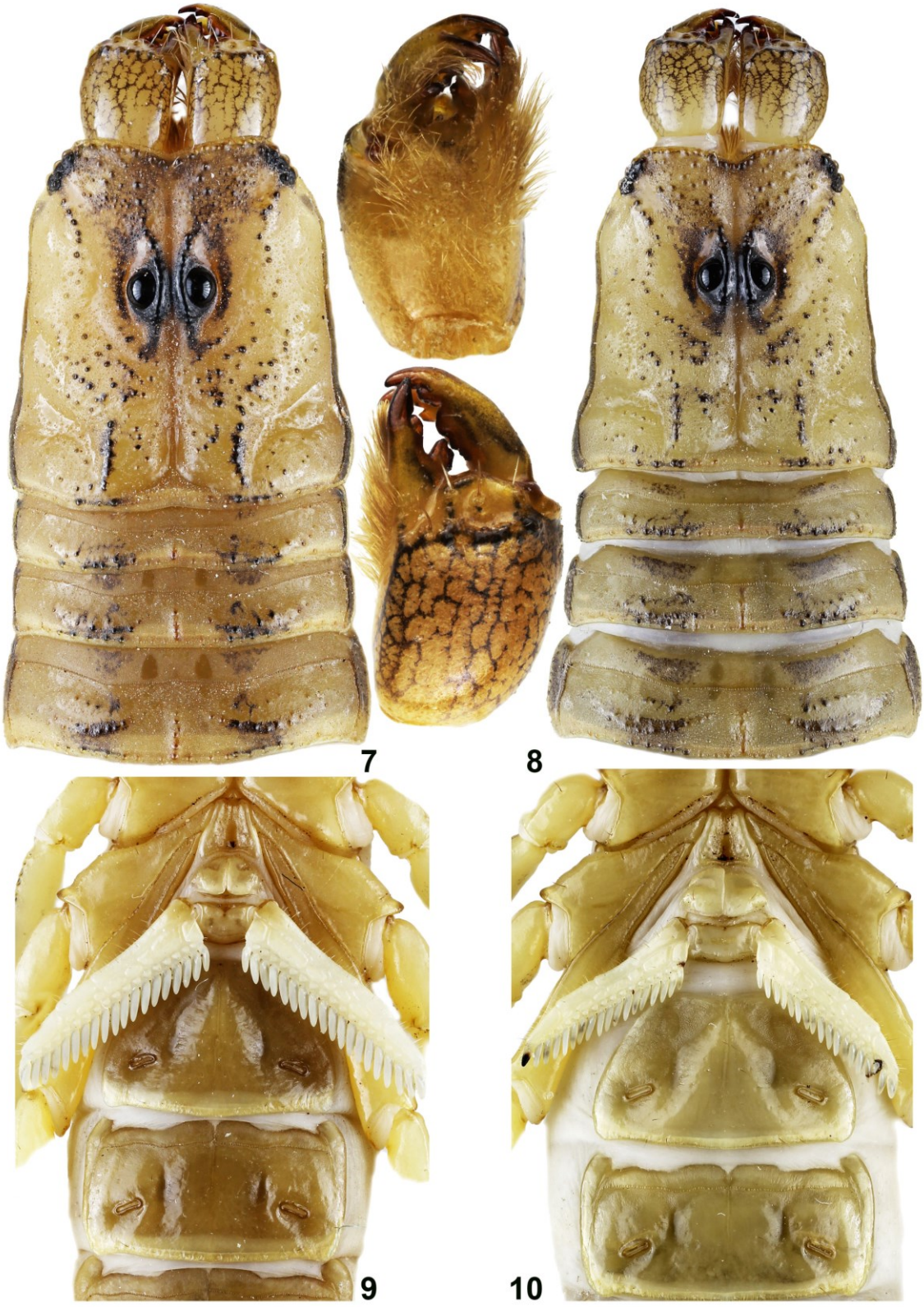


Figures 1–2: Holotype large male of *Centruroides lucidus* **sp. n.** Dorsal (1) and ventral (2) views.

state to subcostate, internal surface with many conical granules scattered; fingers with eight principal rows of denticles, basal lobe/notch combination moderately strong. Carapace and tergites with intercarinal tegument very finely and densely granulose, with many coarser granules scattered. Sternite V with the smooth patch obsolete, densely punctate and setose. Metasoma long, slender, and progressively wider and deeper distally in males, with 10/8/8/8/3 complete, very poorly developed carinae; intercarinal spaces smooth and glossy, with minute granules and punctures scattered. Telson short oval, globose (slightly longer in male), vesicle smooth, with poorly-defined laterodistal swellings in adult males, subaculear tubercle moderate to small, coarsely crest-like and not too close to the base of aculeus. Pectinal tooth count 18–21 (mode 20) in males, 17–21 (mode 19–20) in females; female basal plate with a large and somewhat deep, transverse central depression.

DESCRIPTION (adult male holotype unless otherwise noted). **Coloration** (Figs. 1–2, see also paratypes in Figs. 3–33). Base color light yellow, slightly paler on legs and venter and becoming slightly darker and with an orange shade on metasomal segment V and pedipalp fingers. Chelicerae with manus moderately reticulate with medium brown, in a pattern essentially uniform all

Figures 3–6: Paratypes of *Centruroides lucidus* **sp. n.** from Los Tres Charcos, dorsal and ventral views: standard male (3–4) and large female (5–6).



Figures 7–10: Paratypes of *Centruroides lucidus* **sp. n.** from Los Tres Charcos: chelicerae, carapace and tergites I–III, male (7) and female (8), sternopectinal region and sternites III–IV, male (9) and female (10).

Dimensions		Los Tres Charcos			
		♂ Paratype	♂ Paratype	♂ Paratype	♂ Holotype
Carapace	L / W	4.24 / 4.00	4.60 / 4.30	5.10 / 5.00	5.60 / 5.25
Mesosoma	L	11.30	13.60	15.70	17.20
Tergite VII	L / W	3.30 / 3.28	3.82 / 3.82	4.20 / 4.50	4.70 / 4.70
Metasoma + Telson	L	33.81	36.68	41.64	53.10
Segment I	L / W / H	4.48 / 1.88 / 1.80	4.88 / 2.00 / 2.00	5.70 / 2.30 / 2.20	7.50 / 2.55 / 2.40
Segment II	L / W / H	5.72 / 1.82 / 1.80	6.15 / 2.00 / 2.07	7.12 / 2.22 / 2.10	9.40 / 2.45 / 2.20
Segment III	L / W / H	6.20 / 1.90 / 1.68	6.70 / 1.99 / 2.00	7.60 / 2.30 / 2.18	10.10 / 2.55 / 2.18
Segment IV	L / W / H	6.28 / 1.96 / 1.64	6.85 / 2.10 / 1.90	7.90 / 2.30 / 2.18	9.80 / 2.50 / 2.20
Segment V	L / W / H	6.20 / 2.10 / 1.85	6.50 / 2.22 / 2.12	7.52 / 2.45 / 2.20	9.30 / 2.75 / 2.60
Telson	L	4.93	5.30	5.80	7.00
Vesicle	L / W / H	3.03 / 1.83 / 1.55	3.20 / 2.00 / 1.80	3.50 / 2.10 / 1.82	4.30 / 2.60 / 2.25
Aculeus	L	1.90	2.10	2.30	2.70
Pedipalp	L	18.08	18.82	21.39	24.73
Femur	L / W	4.28 / 1.10	4.44 / 1.25	5.00 / 1.33	5.93 / 1.55
Patela	L / W	4.92 / 1.31	5.23 / 1.91	5.92 / 2.15	6.80 / 2.45
Chela	L	8.88	9.15	10.47	12.00
Manus	L / W / H	3.68 / 2.10 / 1.30	3.83 / 2.42 / 2.17	4.37 / 2.45 / 2.30	5.25 / 3.15 / 3.70
Movable finger	L	5.20	5.32	6.10	6.75
Total	**L**	**49.35**	**54.58**	**62.44**	**75.90**

Table 1: Measurements (mm) of four adult male types of *Centruroides lucidus* **sp. n.**, from RTO collection. Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (H).

Dimensions		Los Tres Charcos		
		♀ Paratype	♀ Paratype	♀ Paratype
Carapace	L / W	4.80 / 4.70	5.40 / 5.40	6.00 / 6.00
Mesosoma	L	11.20	13.90	16.10
Tergite VII	L / W	3.50 / 5.20	3.80 / 5.35	4.40 / 6.80
Metasoma + Telson	L	28.21	33.91	36.64
Segment I	L / W / H	3.70 / 2.25 / 2.35	4.30 / 3.00 / 2.55	4.72 / 3.20 / 2.70
Segment II	L / W / H	4.50 / 2.45 / 2.25	5.30 / 2.88 / 2.65	5.92 / 3.00 / 2.78
Segment III	L / W / H	4.71 / 2.43 / 2.25	5.71 / 2.82 / 2.65	6.00 / 3.02 / 2.80
Segment IV	L / W / H	5.00 / 2.50 / 2.25	6.00 / 2.85 / 2.60	6.50 / 3.08 / 2.82
Segment V	L / W / H	5.15 / 2.45 / 2.30	6.35 / 2.90 / 2.75	6.80 / 3.14 / 2.97
Telson	L	5.15	6.25	6.70
Vesicle	L / W / H	2.60 / 1.88 / 1.68	3.15 / 2.22 / 2.12	3.50/ 2.50 / 2.30
Aculeus	L	2.55	3.10	3.20
Pedipalp	L	17.52	20.75	21.95
Femur	L / W	4.10 / 1.83	4.75 / 1.55	5.02 / 1.55
Patela	L / W	4.90 / 2.05	5.54 / 2.40	5.83 / 2.55
Chela	L	8.52	10.46	11.10
Manus	L / W / H	3.22 / 2.42 / 2.20	4.10 / 2.72 / 2.47	4.20 / 3.00 / 2.70
Movable finger	L	5.30	6.36	6.90
Total	**L**	**44.21**	**53.21**	**58.74**

Table 2: Measurements (mm) of four adult female paratypes of *Centruroides lucidus* **sp. n.**, from RTO collection. Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (H).

Sex	N	Pectinal tooth count					Ave.	SD
		17	18	19	20	21		
♂♂	46		3	5	32	6	19.89	± 0.71
♀♀	46	4	9	15	15	3	19.08	± 1.07

Table 3: Variation of pectinal tooth count in *Centruroides lucidus* **sp. n.** Abbreviations: number of pectines (N), average (Ave.), standard deviation (SD).

Figures 11–19: Paratypes of *Centruroides lucidus* **sp. n.** from Los Tres Charcos: pedipalp trochanter and femur, dorsal view, male (11), pedipalp patella, dorsal view, male (12), pedipalp patella, external view, male (13), pedipalp chela, dorsal view, male (14), pedipalp chela, external view, male (15), pedipalp chela, dorsal view, female (16), pedipalp movable finger, dorsal view, female (17), telson, lateral view, male (18) and female (19). Trichobothrial pattern depicted in Figures 11–13, 15.

over the segment; fingers faintly infuscate. Pedipalps with coxa, trochanter, femur and patella very sparsely spotted with medium brown except ventrally, remarkably denser and darker over carinae; chela with manus sparsely spotted with medium brown only externally (the remaining surfaces are essentially immaculate), fingers very faintly infuscate, only slightly darker than manus. Carapace very sparsely and symmetrically spotted with medium brown, spots almost entirely concentrated inside the interocular triangle, around median eyes, and under carinae and coarse granules; eyes, ocular tubercles and lateral margins blackish. Tergites only with lateral margins irregularly infuscate and with two narrow, discontinuous and irregular dark submedian stripes. Coxosternal region and genital operculum pale immaculate. Pectines pale yellowish, with basalmost portion and basal plate slightly darker due to heavier sclerotization. Sternites pale immaculate; V with the smooth patch indistinct, translucent. Legs sparsely infuscate, only dorsally and externally. Metasoma with base color becoming slightly darker distally with an orange shade, with all segments very sparsely spotted with grayish brown laterally and moderately spotted with medium brown ventrally, darker and denser between ventrosub-

median carinae as an irregular thin, dark ventromedian stripe all along from I through V. Telson with vesicle very sparsely infuscate, in an irregular pattern of longitudinal stripes becoming somewhat darker and better defined distally; aculeus deeply infuscate basally, with distal half blackish.

Chelicerae (Fig. 7 depicts male paratype). Dentition typical of the genus; teeth large and sharp. Tegument glossy but with minute granulation scattered, dorsodistal portion of manus with coarse, glossy granules irregularly arranged transversally, defining a depressed area. Setation very dense ventrally, but essentially lacking dorsally, except for five rigid macrosetae around depressed area of manus.

Pedipalps (Figs. 11–15 depict male paratype). Large and robust for the genus, almost glabrous and orthobothriotaxic A-α. Femur essentially straight and very sparsely setose, all carinae moderately serrate to strongly denticulate, intercarinal tegument finely and very densely granulose. Patella slightly curved inwards and very sparsely setose, all carinae weakly to moderately granulose, intercarinal tegument finely and very densely granulose, internally with abundant sharp, conical tubercles of various sizes. Chela robust and sparsely setose; manus stout oval (1.67 times longer than wide), much wider than patella (ratio 1.29), and with the basal half widest, with all carinae obsolete to vestigial, weakly costate to subcostate, intercarinal tegument glossy, with minute granules scattered on all surfaces and abundant sharp, conical granules internally; fingers long but thick (movable finger 1.29 times longer than underhand), evenly curved, moderately setose, and with 8/8 principal rows of denticles flanked by 2–4 supernumerary denticles on each side (usually two, but increasing in number basally and vice versa), movable finger with apical subrow of four denticles plus a large internal accessory denticle (large terminal denticle not included), basal lobe/notch combination moderately strong.

Carapace (Fig. 7 depicts male paratype). Trapezoidal and longer than wide; anterior margin very medially notched and with frontal lobes widely convex (i.e., not V-shaped), with two pairs of medium-sized macrosetae and some inconspicuous microsetae. Carination essentially absent: the only definable carinae are the superciliary (strong, costate, glossy) and the posterior medians (moderate, formed by isolate, medium-sized, glossy granules). Furrows: anterior median, median ocular, central median, posterior median and posterior marginal fused, narrow and deep, posterior laterals long, narrow and deep, other furrows indistinct. Tegument very finely and densely granulose, with many medium-sized, glossy granules scattered, mostly over dark patches. Median eyes very large, separated by about one ocular diameter; lateral eyes much smaller, all same-sized.

Sternum (Fig. 9 depicts male paratype). Standard for the genus: type 1, medium-sized, longer than wide, and subtriangular in shape, with two pairs of long macrosetae. Tegument minutely, densely granulose.

Genital operculum (Fig. 9 depicts male paratype). Medium-sized, halves narrowly separated and subtriangular in shape, with two pairs of medium-sized macrosetae and several microsetae. Genital papillae medium-sized, not protruding, with tips narrowly conical. Prepectinal plate heavily sclerotized and widely crescent-shaped.

Pectines (Fig. 9 depicts male paratype). Size and shape standard for the genus: just reaching leg IV trochanter, subrectangular and moderately setose. Tooth count 20/19, teeth conspicuously swollen and basally separate. Basal plate moderately sclerotized, wider than long, anterior margin with a deep, V-shaped anteromedian notch, posterior margin very widely convex.

Legs (Figs. 26–29 depict male paratype). Slender, with all carinae finely granulose to serrate, intercarinal tegument coriaceous to glossy, with minute granules scattered mostly on femur. Prolateral and retrolateral pedal spurs strong. Ventral surface of all tarsomeres II round and very densely covered by long, dark setae irregularly arranged into two longitudinal, broad, dense rows converging basally. Claws short and strongly curved.

Mesosoma (Figs. 7 and 9 depict male paratype). Tergites with the same sculpture as on carapace; I–VI with only one well-defined median longitudinal carina (long, moderately strong, formed by partially anastomosed, medium-sized, glossy granules that do not project beyond posterior margin), with very subtle traces of accessory dorsosubmedian carinae on IV–VI; VII with five carinae (median, submedians and laterals) which are very long, moderate and finely crenulate to subserrate. Sternites essentially glabrous, with spiracles oblique, long and slit-like, posterior margin of III–V widely convex, VI straight, VII narrowly concave; III acarinate, intercarinal tegument divided by submedian longitudinal depressions into a median triangular area which is slightly raised, smooth and glossy, and two lateral areas which are slightly depressed, finely and densely granulose; IV acarinate, intercarinal tegument divided by submedian longitudinal depressions into a median rectangular area which is smooth and glossy, and two lateral areas which are minutely granulose; V acarinate and with posterior margin not lobed, intercarinal tegument divided by submedian longitudinal depressions into a median rectangular area which is smooth and glossy, and two lateral areas which are minutely granulose, smooth patch indistinct, translucent, and densely setose, the base of each seta is invaginated into a coarse puncture; VI with smooth vestiges of four pairs of carinae (ventrosubmedians and laterals), otherwise identically sculptured to IV; VII with two pairs of long carinae: sub-

Figures 20–25: Paratypes of *Centruroides lucidus* **sp. n.** from Los Tres Charcos, metasoma: dorsal view, male (20) and female (23), ventral view, male (21) and female (24), lateral view, male (22) and female (25).

Figures 26–29: Paratype male of *Centruroides lucidus* **sp. n.** from Los Tres Charcos, legs I–IV (from left to right), internal view.

median pair vestigial and smooth to subcostate, lateral pair weak and costate to subgranulose, intercarinal tegument smooth to minutely granulose.

Metasoma (Figs. 20–22 depict male paratype). Long, slender, and progressively wider and deeper distally; I with ten complete, coarse carinae, II–IV with eight, and V with three: dorsolaterals weakly subcrenulate to subdenticulate on I–II, very weakly subcrenulate to subdenticulate on III, vestigially subcrenulate on IV, absent on V; lateral supramedians weakly subcrenulate on I–II, very weakly subcrenulate on III, vestigially subcrenulate on IV, absent on V but indicated by extremely vestigial ridges basally and distally; lateral inframedians weakly subcrenulate on I, absent on II–V; ventrolaterals weakly subcrenulate on I–II, very weakly subcrenulate on III–IV, vestigially subcrenulate on V; ventrosubmedians very weakly subcostate to subserrate on I, weakly serrate on II-III, moderately serrate on IV,

Figures 30–32: Live small female paratype of *Centruroides lucidus* **sp. n.** from Los Tres Charcos (30), with newborn (31), and with juveniles after first ecdysis (32).

Figures 33–34: Live standard male paratypes of *Centruroides lucidus* **sp. n.** from Los Tres Charcos (33) and detailed view of habitat at this locality (34).

Characters	*C. nitidus*	*C. lucidus* sp. n.	*C. bani*
1. Base color	Yellowish brown	Light yellow to pale yellowish brown	Yellowish brown
2. Metasoma, ventral color pattern	Densely but irregularly spotted with blackish brown	With an irregular, narrow ventromedian dark band	With a compact, broad ventromedian blackish band
3. Pedipalp fingers, color	Much darker than manus, blackish	Slightly to conspicuously darker than manus, variably infuscate	Much darker than manus, blackish
4. Pedipalp manus, shape	♂: very robust, stout ♀: very robust, globular	♂: robust, stout ♀: robust, round	♂: robust, stout ♀: very robust, globular
5. Pedipalp manus, carinae	Obsolete to vestigial	Obsolete to vestigial	Weak to moderate
6. Pedipalp manus, setation	♂: dense ♀: very dense	♂: very scarce ♀: very scarce	♂: dense ♀: very dense
7. Pedipalp manus, dorsal and external intercarinal sculpture	Glossy, smooth	Glossy, with minute granules	Coriaceous, with irregular granulation scattered
8. Pedipalp fingers, shape	Short, thick. Basal lobe/notch combination very strong	Long, thick. Basal lobe/notch combination moderately strong	Long, thick. Basal lobe/notch combination moderately strong
9. Metasoma, shape	♂: robust ♀: robust	♂: slender ♀: slender	♂: slender ♀: robust
10. Metasoma, ventrolateral macrosetae on segments II–IV	3-5 pairs	3-4 pairs	2 pairs
11. Metasoma, dorsolateral and lateral supramedian carinae	♂: absent to very weak, smooth to subcrenulate	♂: obsolete to weak, subcrenulate to subdenticulate	♂: weak to moderate, crenulate to serrate
12. Metasoma, intercarinal sculpture	Smooth, glossy, with irregular granulation scattered	Smooth, glossy, with minute granules and punctures scattered	Coriaceous, with irregular granulation scattered
13. Pectines, basal plate depression	♀: absent to vestigial	♀: large, transverse, deep	♀: large, transverse, shallow
14. Sternite V, posterior margin	♂: weakly to moderately lobed	♂: widely convex to shallowly lobed	♂: widely convex to shallowly lobed

Table 4: Diagnostic comparison among three closely-related Hispaniolan species of the genus *Centruroides*.

Locality	Scorpion Species	
	Syntopic (on the vegetation)	**Sympatric (on the ground)**
Pedernales Province		
1. Sabana de Sansón	• *Centruroides bani* Armas & Marcano Fondeur, 1987 • *Rhopalurus bonettii* Armas, 1999	• *Centruroides alayoni* Armas, 1999 • *Centruroides bani* Armas & Marcano Fondeur, 1987 • *Microtityus iviei* Armas, 1999 • *Rhopalurus princeps* (Karsch, 1879) • *Heteronebo dominicus* Armas, 1981 • *Heteronebo oviedo* (Armas, 1999)
2. Los Tres Charcos		• *Centruroides alayoni* Armas, 1999 • *Microtityus iviei* Armas, 1999 • *Microtityus lantiguai* Armas & Marcano Fondeur, 1992 • *Rhopalurus bonettii* Armas, 1999 • *Heteronebo oviedo* (Armas, 1999)
3. Fondo Paradí	• *Centruroides jaragua* Armas, 1999 • *Tityus crassimanus* (Thorell, 1876)	• *Centruroides alayoni* Armas, 1999 • *Microtityus iviei* Armas, 1999 • *Microtityus lantiguai* Armas & Marcano Fondeur, 1992 • *Rhopalurus bonettii* Armas, 1999 • *Heteronebo oviedo* (Armas, 1999)
4. Isla Beata	• *Centruroides jaragua* Armas, 1999	• *Centruroides alayoni* Armas, 1999 • *Microtityus lantiguai* Armas & Marcano Fondeur, 1992 • *Rhopalurus bonettii* Armas, 1999
Barahona Province		
5. Km 7 on road Cabral-Polo	• *Tityus crassimanus* (Thorell, 1876)	• *Centruroides marcanoi* Armas, 1981 • *Microtityus iviei* Armas, 1999 • *Heteronebo* sp.n.
6. Maniel Viejo	• *Centruroides marcanoi* Armas, 1981 • *Tityus crassimanus* (Thorell, 1876)	

Table 5: Scorpion species sympatric with *Centruroides lucidus* **sp. n.** in each locality, according to the personal collections of the authors. Locality names are abbreviated; see specimen list for complete label data.

absent on V but indicated by vestigially subserrate ridges on basal fourth; ventromedian absent on I–IV, vestigially to weakly subcrenulate on V. Intercarinal tegument smooth and glossy, with minute granules and punctures scattered (especially laterally and on V). Dorsal furrow shallow on all segments. Three pairs of ventrolateral macrosetae on I–V, plus inconspicuous microsetae scattered over all carinae.

Telson (Fig. 18 depicts male paratype). Essentially bare, with a few inconspicuous setae of various sizes scattered all over (each macroseta with base invaginated as a coarse puncture). Vesicle short oval, globose, and slightly depressed (1.65 times longer than wide, 1.16 times wider than deep), with poorly-defined, round laterodistal swellings, tegument glossy, with minute granules and punctures scattered; ventromedian carina vestigially subgranulose, progressively elevated into a broad, crest-like subaculear tubercle which is moderately-sized, blunt, not too close to the base of aculeus, and bears a dorsal granule. Aculeus thick, sharp, shorter than vesicle and strongly curved.

FEMALE (paratype: Figs. 5–6, 8, 10, 16–17, 19, 23–25, 30–32; Tabs. 2–4). Similar to male in coloration, but with well-marked sexual dimorphism: **(1)** size conspicuously smaller; **(2)** pedipalp manus shorter and rounder; **(3)** genital papillae and pre-pectinal plate absent; **(4)** pectines only slightly shorter, not reaching the coxa-trochanter joint of leg IV; **(5)** basal pectinal plate wider, with anterior margin less notched, with posterior margin slightly more convex, and with a large and somewhat deep, transverse central depression; **(6)** mesosoma wider, with sides more convex; **(7)** metasomal segments and telson conspicuously shorter, wider and deeper.

VARIATION. Adult size varied from 49.4–75.9 mm in males and 44.2–58.7 mm in females (Tabs. 1–2); the examined sample contains four size classes among males and three in females, but in the latter sex a fourth (largest) class can be predicted to occur based on proportional comparison with males. Inside the same class, males are much larger than females, matching the standard for the genus. As usually observed amongst scorpions, smaller adults invariably exhibit the weaker expression of secondary sexual dimorphic characters such as the elongation of pedipalps and metasoma, i.e., smaller males are always proportionally less slender. Nevertheless, the dimorphism is always well-evident and adults of any size class can be easily sexed even to unaided eye.

The base color presented only minor variations among different individuals: some are paler and less spotted, while others are somewhat darker and more densely maculate; such variation is similar in extent both between and inside populations where enough specimens are available, e.g., Los Tres Charcos (see Figs. 1–6, 30–33).

The number of principal rows of denticles in pedipalp fingers and the composition of apical subrow of movable finger were both invariable in all examined specimens (Fig. 17).

Pectinal tooth counts varied in the whole sample from 18–21 in males and 17–21 in females, with modes of 20 and 19–20 in each sex, respectively (Tab. 3). There is no detectable variation between different populations and also the degree of variation observed is larger within than between compared populations.

COMPARISON. The combination of medium to moderately large size, two dark stripes over tergites, large and robust pedipalps, and weakly carinate, glossy metasoma exhibited by *C. lucidus* **sp. n.** is shared in Hispaniola only by two species which also occur also in the same general area: *C. nitidus* and *C. bani*. Herein we present in detail all diagnostic differences of these three taxa (Tab. 4), but in general, *C. lucidus* **sp. n.** can be easily distinguished from the other two species by its more slender and paler appearance, well evident even to unaided eye.

DISTRIBUTION (Fig. 35). This species is widespread all along the Pedernales-Barahona coastal plain up to the lower foothills of mostly the southern watershed of the adjacent Sierra de Bahoruco mountain range (only one population has been found in the northern watershed, on Cabral-Polo road). Taking into account that one of the localities lies in the border with Haiti (Pedernales town), the occurrence of *C. lucidus* **sp. n.** in that country can be safely predicted.

ECOLOGICAL DATA. This is a xerophilous species that inhabits dry and hot areas, with vegetation ranging from coastal semi desert to dry semi-caducifolious forest (Fig. 34). Moreover, it is exclusively arboreal, as all specimens either personally collected by us or with complete label data have been found under barks of trees, bushes, and wooden fence posts, as well as inside dry cacti and live epiphytic bromeliads. Also, *C. lucidus* **sp. n.** is a lowland scorpion: we have made intensive searches up the mountain slopes of the Sierra de Bahoruco, but we have found it only from the 500 m altitude contour down.

During daytime searches, as soon as this species is uncovered from under the bark or a bract where it is hiding, individuals never stay still, but display a rush escape behavior. This consists in two very different choices: **1)** to roll-up tightly the body and appendages and drop to the ground to immediately hide under leaf litter; **2)** to run fast along the log and enter the first crevice available. Both choices are usually taken depending upon whether the specimen has been directly

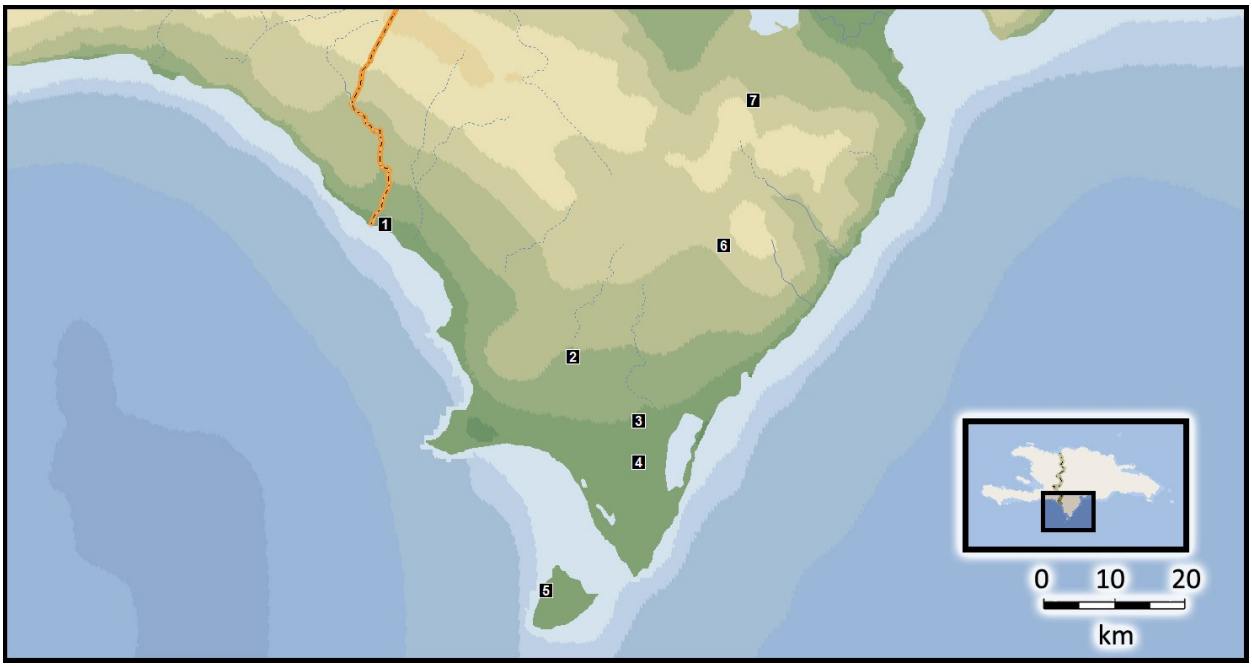


Figure 35: Known geographical distribution of *Centruroides lucidus* **sp. n.**: Pedernales (1), Sabana de Sansón (2), Los Tres Charcos (3), Fondo Paradí (4), Isla Beata (5), Maniel Viejo (6), Cabral-Polo road (7).

touched during the uncovering process or not, respectively.

Four females (two from Los Tres Charcos, one each from Cabral-Polo road and Maniel Viejo) gave birth in captivity to litters of 18, 20, 21, and 23 newborn; first instar lasted for 4–6 days.

REMARKS. The specimens from Barahona (Cabral-Polo road and Maniel Viejo) have been excluded from the type series because they show some differences when compared to those from southern Pedernales, which are remarkably homogeneous. Sample from those eastern populations (Fig. 35) is too small for a reliable analysis and we lack any from intermediate areas; thus, we have regarded them here only tentatively as conspecific with *C. lucidus* **sp. n.**

A direct examination of the specimens from Los Tres Charcos, Isla Beata, and Cabral-Polo road, misidentified by Armas & Marcano Fondeur (1992), Armas et al. (1999) and Armas (2002) as either *C. nitidus* or *C. tenuis*, demonstrated that all these specimens belong to *C. lucidus* **sp. n.**

After this addition, the Hispaniolan fauna of *Centruroides* is known to contain six species, all of them endemic to the island and monotypic. However, such diversity is still underestimated: at least one more new species is currently being described and the status of other taxa (including *C. tenuis* and *C. zayasi*) is being finally clarified, results that will be soon published by our team (R. Teruel, L. F. de Armas & F. Kovařík, in preparation).

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