





STUDIES ON NEOTROPICAL PHASMATODEA XXI: *SIGARUPHASMA*,  
A NEW GENUS OF HESPEROPHASMATINI BRADLEY & GALIL, 1977,  
FROM HISPANIOLA WITH THE DESCRIPTIONS OF TWO NEW SPECIES  
(PHASMATODEA: CLADOMORPHINAE)

**Estudios sobre Phasmatodea neotropicales XXI: *Sigaruphasma*, un nuevo género de  
Hesperophasmatini Bradley y Galil, 1977, de la Hispaniola,  
con la descripción de dos nuevas especies (Phasmatodea: Cladomorphinae)**

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ABSTRACT

The new Hesperophasmatini–genus *Sigaruphasma* **gen. nov.** from Hispaniola is described and illustrated. It is remarkable for violating several of the previously stated diagnostic features of the tribe Hesperophasmatini Bradley and Galil, 1977. It is well characterized by the cylindrical, cigar–like body of females, proportionally very short legs, strongly broadened profemora of females, lacking sensory–areas on the probasisternum and profurcasternum as well as the smooth egg–capsule. Two new species are described from the Dominican Republic, both from the males, females and eggs. *S. bouldouei* **sp. nov.** occurs in the eastern portion of Hispaniola (Monseñor Nouel, San Cristóbal, San José de Ocoa and Samaná provinces) and has fully winged males. *S. armatum* **sp. nov.** occurs in the southern and southeastern Dominican Republic (Barahona, La Vega, San José de Ocoa, Elías Piña, Santiago provinces) and has apterous males with a strong body spination. Both species show a remarkable range of intraspecific variability and polymorphism, which is described and illustrated.

**Keywords:** Stick insects, phasmids, Phasmatodea, Cladomorphinae, Hesperophasmatini, Hispaniola, Dominican Republic, new genus, new species, descriptions, eggs.

RESUMEN

Se describe e ilustra el nuevo género *Sigaruphasma* **gen. nov.**, originario de la Hispaniola, perteneciente a la tribu Hesperophasmatini. Es excepcional por no cumplir con varias de las características de diagnóstico reconocidas hasta ahora para la tribu Hesperophasmatini Bradley y Galil, 1977. Es bien característico por presentar las hembras un cuerpo cilíndrico similar a un cigarro, extremidades proporcionalmente muy cortas, profemora muy anchas, ausencia de áreas sensoriales en probasisternum y profurcasternum así como huevos con superficie lisa. Se describen dos nuevas especies de República Dominicana, en ambos casos a partir de machos, hembras y huevos. *S. bouldouei* **sp. nov.** se distribuye al este de la Hispaniola (provincias de Monseñor Nouel, San Cristóbal, San José de Ocoa y Samaná) y los machos poseen alas. *S. armatum* **sp. nov.** se distribuye al sur y sureste de República Dominicana (provincias de Barahona, La Vega, San José de Ocoa, Elías Piña y Santiago) y posee machos ápteros con cuerpo espinoso. Ambas especies presentan un amplio rango de variabilidad intraespecífica y polimorfismo, el cual se describe e ilustra.

**Palabras clave:** Insectos palo, fásmidos, Phasmatodea, Cladomorphinae, Hesperophasmatini, Hispaniola, República Dominicana, nuevo género, nuevas especies, descripciones, huevos.

## INTRODUCTION

The phasmid fauna of the Greater Antilles is by far richer and more diverse than supposed previously. This became particularly obvious by the investigation of extensive material at hand from the island of Hispaniola. A survey of the Hispaniolan orthopteroid insects was carried out by the Hispaniolan Orthopteroids Project from 2002 through 2004, which comprised eight international expeditions and collections at as many as 280 sites distributed throughout the area of the Dominican Republic. Besides many interesting Orthoptera, an abundant number of Phasmatodea were collected, which multiply the number of species known from Hispaniola. Almost all regions and habitats of the island still harbour many so far unrecognized taxa, some of which are described in the present paper. Four previous papers by the authors have already dealt with some of the material collected by the Hispaniolan Orthopteroids Project and described three new genera and fifteen new species (Conle *et al.*, 2006; 2008; 2014; Hennemann *et al.*, 2016).

The new genus described herein belongs in the diverse and still fractionally known tribe Hesperophasmatini Bradley and Galil, 1977 (subfamily Cladomorphinae). This predominantly West Indian tribe only has two genera in Central America (Hennemann & Conle, 2012) with all other genera distributed throughout the Greater Antilles, Virgin Islands and the northern Lesser Antilles. Although it obviously belongs in that tribe, the new genus is remarkable for violating several of the previously stated diagnostic features (Hennemann *et al.*, 2016: 23). The strong polymorphism of the two new species described herein suggests there are still several further undiscovered species that belong in this genus. For fully understanding its relationships more extensive investigation of other closely but still unrecognized taxa from throughout Hispaniola appears necessary, which will be subject of forthcoming publications dealing with the extensive material at hand.

*Abbreviations used.* USNM: United States National Museum of Natural History, Smithsonian Institution, Washington DC, USA. FH: Personal collection of Frank H. Hennemann, Bad Homburg, Germany. OC: Personal collection of Oskar V. Conle, Duisburg, Germany. HT, PT: holotype, paratype.

## OBJECTIVE

- To describe a new genus and two new species of phasmids from the Dominican Republic, Hispaniola.

## MATERIAL AND METHODS

The material at hand for this study is exclusively dried and pinned. Insects and eggs were examined using an entomological lens with 4x magnification and a stereoscope (Zeiss Stemi SV 6). Eggs were examined at 10x magnification. Measurements were taken using a long rule or a digital caliper and are given to 0.1 mm. Average measurements are given. All eggs examined were already laid, hence are fully developed. The terminology used for the descriptions of external and internal egg structures follows that of Sellick (1997). If not differently cited the colouration is described from live specimens. Photos were taken either using a Nikon D7000 camera equipped with a Nikon DX AF-S Micro 40 mm lens, Nikon D7100 camera with a AF-S Nikkor 60 mm f/2.8 G ED lens. For the eggs, photos were taken using a Sony A7RIII with a Tamron 90 mm f/2.8 DI VC USD MACRO and Raynox DCR-250. Lighting was made with a Nikon SU-800 dual speed light system and background illumination provided by a 18W 6000K LED panel light plate.

## RESULTS

**Taxonomy***Sigaruphasma* **gen. nov.**

Type species: *Sigaruphasma bouladoui* **sp. nov.**, by present designation.

*Etymology.* The generic name is a combination of (*sigarus* lat. = cigar), which refers to the cylindrical body and cigar-like appearance of females of this new genus and the greek *φάσμα* (= phasma), which means “ghost”. Neuter.

*Diagnosis of genus.* Medium to large member of the tribe Hesperophasmatini with an elongate and slender body and proportionally very short legs in females. Females apterous, males either pterous or apterous. Body cylindrical, granulose, rugulose or verruculose to a variable degree; at least pronotum with spines. Head flattened and unarmed; no ocelli. Antennae moderately robust and perlamorph; longer than head, prothorax and mesothorax combined. No sensory-areas on prosternum and profurcasternum. Mesothorax > 3.5x longer than prothorax; mesosternum tectinate longitudinally in males. Metapleurae with a distinct supra-coxal spine in males. Tegmina in males strongly conical. Anal region of alae irregularly mottled with grey. Abdomen excluding median segment longer than head and thorax combined. Median segment slightly shorter (females) or longer than metanotum (males). Abdominal segments II–VII longer than wide. Praeopercular organ on abdominal sternum VII of females distinct. Subgenital plate of females elongated and extending beyond apex of abdomen. Anal segment of males flattened; vomer well-developed. Legs short in relation to body (females in particular); profemora and mesofemora considerably shorter than mesothorax. Profemora with posterodorsal and posteroventral carinae strongly deflexed, lamellate and undulate in females; simple and slender in males. All femora with a distinct medioventral carina; all three ventral carinae of mesofemora and metafemora spinose to a variable degree. Mesofemora strongly compressed laterally. Metafemora strongly compressed laterally in females with the dorsal carinae somewhat undulate; considerably swollen in males. Tarsi short with basitarsus not longer than following two tarsomeres combined.

*Diagnosis del género.* Miembros de tamaño medio a grande de la tribu Hesperophasmatini, con cuerpo alargado y esbelto y extremidades proporcionalmente muy cortas en hembras. Hembras ápteras y machos alados o ápteros. Cuerpo cilíndrico, rugoso en distintos grados; presencia de espinas al menos en pronoto. Cabeza aplanada y sin espinas; sin ocelos. Antenas moderadamente robustas y similares a cadenas de perlas; de mayor longitud que la combinación de cabeza, pro y mesotórax. No presentan áreas sensoriales en el prosternum y profurcasternum. Mesotórax > 3.5x más largo que el protórax; mesosterno aquillado longitudinalmente en machos. Metapleura con una espina supra-coxal muy evidente. Tegmina en machos cónica. Región anal del ala abigarrada en tonos grises. Abdomen, excluyendo el segmento medio, más largo que la combinación de cabeza y tórax. Segmento medio ligeramente más corto que el metanoto en hembras y más largo en machos. Segmentos abdominales II–VII más largos que anchos. Órgano praeopercular evidente en el esternito abdominal VII de las hembras. Placa subgenital de las hembras alargada y sobrepasando el extremo del abdomen. Segmento anal en machos aplanado; vómer bien desarrollado. Extremidades cortas en relación al cuerpo (especialmente en hembras); profémur y mesofémur considerablemente más cortos que el mesotórax. Profémur con carinas posterodorsal y posteroventral desviadas, laminadas y onduladas en hembras; simples y estrechas en machos. Todos los fémures con una marcada carina medioventral; las tres carinas ventrales de los mesofémures y metafémures son espinosas en distintos grados. Mesofémures fuertemente comprimidos lateralmente. Metafémures fuertemente comprimidos lateralmente en hembras con la carina dorsal más o menos ondulada; considerablemente hinchada en machos. Tarsos cortos, siendo el basitarso no más largo que los siguientes dos tarsómeros combinados.

*Description of genus.* Medium to large member of the tribe Hesperophasmatini (body length ♀♀ incl. subgenital plate 68.1–108.0 mm, ♂♂ 51.1–75.5 mm) with an elongate and slender body. Females with strong morphological variability. Colouration various shades of ochre, grey and brown. Females apterous, males either pterous or apterous. Body cylindrical, granulose, rugulose or verruculose to a variable degree; at least pronotum with a posterior pair of spines (in males occasionally with further spines near posterior margins of all thoracic segments and basal abdominal tergites). Head flattened and unarmed, sub-rectangular in shape and hardly longer than wide; no ocelli. Eyes small in females, large in males, sub-circular and projecting hemispherically. Antennae moderately robust and perlamorph with antennomere III in males longer than preceding and IV; at least reaching to median segment (longer in males). Pronotum with a pair of conspicuous, pointed spines near posterior margin. No sensory-areas on prosternum and profurcasternum. Mesothorax elongate and slender, > 3.5x longer than prothorax; mesosternum tectinate longitudinally in males. Mesopleurae and metapleurae with a supra-coxal spine in males (may be indistinct on mesopleurae). Tegmina in males short and strongly conically raised. Alae absent or well-developed; anal region irregularly mottled with grey. Abdomen excluding median segment longer than head and thorax combined. Median segment slightly shorter (females) or longer than metanotum (males). Abdominal segments II–VII longer than wide. Tergum VI often with a struma or foliaceous posterior swelling in females. VII not deflexed laterally. Praeopercular organ on abdominal sternum VII of females distinct. Epiproct small, scale-like and slightly projecting underneath anal segment. Cerci very small and conical in females, slender, gently in-curving and somewhat club-shaped in males. Gonangulum in females distinct and with outer surface tuberculose. No gonoplags. Gonapophyses VIII slightly longer than gonapophyses IX. Subgenital plate of females keeled longitudinally, elongated and extending beyond apex of abdomen by no more than combined length of tergites IX–X. Anal segment of males flattened, the posterior margin minutely denticulate ventrally. Vomer well-developed, triangular, with a single terminal hook. Poculum bowl-shaped with a somewhat distinct central projection, the posterior margin slightly labiate. Legs short in relation to body (females in particular); profemora and mesofemora considerably shorter than mesothorax. Tibiae slightly shorter than corresponding femora. Profemora with posterodorsal and posteroventral carinae strongly deflexed, lamellate and undulate in females; simple and slender in males. Protibiae undulate in females, slender in males. All femora with a distinct medioventral carina and trapezoidal in cross-section with dorsal carinae approaching each other; all three ventral carinae of mesofemora and metafemora spinose to a variable degree. Mesofemora of both sexes strongly compressed laterally. Metafemora strongly compressed laterally in females with the dorsal carinae slightly undulate; considerably swollen and thickened but smooth dorsally in males. Tibiae trapezoidal in cross-section with dorsal carinae approaching each other. Tarsi short with tarsomeres I–III trapezoidal in cross-section and slightly furrowed dorsally; basitarsus no longer than following two tarsomeres combined.

*Eggs.* Small, ovoid, > 1.5x longer than wide or high, the dorsal surface somewhat more convex than ventral or lateral surfaces; slightly oval in cross-section. Chorion very minutely granulose, shiny. Micropylar plate less than half the length of capsule, positioned in centre of dorsal surface, longer than wide and widened in posterior half. Micropylar cup at posterior end of plate. Internal micropylar plate open with a deep triangular incision; no median line. Operculum almost circular, flat and with a disc-like capitulum.

*Differentiation.* Although *Sigaruphasma* gen. nov. keys out to the tribe Hesperophasmatini Bradley & Galil, 1977, the genus violates several previously stated diagnostic characters of this tribe (Hennemann *et al.*, 2016). Hence, a full definition of the true relationships needs to await knowledge of further still undescribed taxa of Hesperophasmatini from throughout Hispaniola, which will be subject of future works.

*Sigaruphasma* **gen. nov.** differs from all other known genera of Hesperophasmatini by the noticeably more elongate and almost cylindrical body, females having a somewhat cigar-like appearance. Females furthermore readily differ from all other genera by the remarkably short legs, laterally compressed mesofemora and metafemora and strongly broadened, deflexed and lamellate posteroventral carina of the profemora. The very indistinct to obsolete sensory-areas of the probasisternum and profurcasternum are shared with *Lamponius* Stål, 1875. Winged males are characteristic for the strongly conically raised tegmina, while apterous representatives strongly resemble e.g. *Lamponius* Stål, 1875, *Agamemnon* Moxey, 1971 or wingless forms of *Hesperophasma* Rehn, 1901. From both these genera apterous males may only be distinguished by the prominent posterior pair of spines of the pronotum, prominent supra-coxal spine of the metapleurae and distinct longitudinal median keel of the mesosternum. The eggs readily differ from those of all other Hesperophasmatini-genera by completely lacking hairy structures on the capsule and operculum and having a smooth and shiny capsule surface.

*Distribution.* Hispaniola, endemic.

*Species included.* *Sigaruphasma armatum* sp. nov. and *Sigaruphasma bouldouei* sp. nov.

#### KEY TO THE SPECIES OF *SIGARUPHASMA* GEN. NOV.

♀♀

1. Posterior pair of spines on pronotum prominent and projecting vertex in height; mesonotum and metanotum with a posterior pair of spines (may be very indistinct); mesofemora and metafemora with a prominent and pointed dorso-apical spine that projects over knee joint; dorsal carinae of mesotibiae and metatibiae distinctly lobed/toothed.....*armatum* sp. nov.

-Posterior pair of spines on pronotum shorter; no posterior pair of spines on mesonotum and metanotum; mesofemora and metafemora without a distinct dorso-apical spine; dorsal carinae of mesotibiae and metatibiae at best with very minute and obtuse denticles.....*bouldouei* sp. nov.

♂♂

1. Apterous; with large paired spines at posterior margin of all thoracic nota and abdominal tergites I-IV..... *armatum* sp. nov.

- Winged (alae reaching to abdominal segment VI); thoracic nota (except pronotum) and abdominal tergites I-IV without paired posterior spines.....*bouldouei* sp. nov.

#### *Sigaruphasma armatum* sp. nov.

Figures 1-3, 6d-f, 7, 8a

*Diagnosis of species.* Of moderate size for the genus. Female: Elongate, slender with none of the abdominal segments considerably widened. Colour various shades of ochre, grey or brown, occasionally with irregular white or pale cream markings or faint longitudinal lines; mesosternum somewhat reddish and anterior surface of mesofemora dull orange to pale red. Posterior margin of pronotum with a strong pair of spines, a smaller pair of spines at posterior margin of mesonotum and metanotum. Mesonotum and mesopleurae may be spinose. Median segment and abdominal tergum VI often with a struma or foliaceous projection at posterior margin. Posteroventral carina of profemora very strongly deflexed and irregularly undulate with a large

sub-basal lobe on posteroventral carina. Mesofemora and metafemora with dorsal carinae strongly undulate and all three ventral carinae heavily spinose; dorso-apically with a prominent spine that projects over knee joint. All tibiae lobate or dentate dorsally. Male: Slender, apterous with dorsal body surface strongly spinose. Pronotum with a large posterior pair of spines and a prominent pair of spines at posterior margin of mesonotum and metanotum and abdominal segments I–IV. Colour ranging from dull green over ochre and drab to mid brown; basal portion of all femora green.

*Diagnosis de la especie.* Tamaño moderado para el género. Hembra: alargada, esbelta, ninguno de los segmentos abdominales considerablemente ensanchado. Coloración en tonos ocres, grises o marrones, en ocasiones con marcas irregulares o líneas longitudinales difusas de color blanco o crema; mesosterno más o menos rojizo y la superficie anterior de los mesofémures de naranja a rojo pálido. Margen posterior del pronoto con un par de espinas bien desarrolladas, otro par de menor tamaño en el margen posterior del mesonoto y metanoto. Mesonoto y mesopleura en ocasiones espinosa. Segmento medio y terguito abdominal VI generalmente con una proyección foliácea en el margen posterior. Carinas posteroventrales de los profémures fuertemente desviadas e irregularmente onduladas, con un gran lóbulo sub-basal en la carina posteroventral. Mesofémur y metafémur con una carina dorsal ondulada y las tres carinas ventrales espinosas. Macho: Esbelto, áptero con la superficie dorsal del cuerpo espinosa. Pronoto con un par de espinas grandes posteriores, además de otro par de espinas prominentes en el margen posterior del mesonoto y metanoto, así como en los segmentos abdominales I–IV. Coloración variable de verde y ocre a tonos uniformes de marrón; porción basal de todos los fémures de color verde.

*Differentiation.* Males readily differ from *S. bouladoui* sp. nov. by being wingless. Furthermore, they differ from males of that species by the much stronger body spination, much larger posterior pair of spines on the pronotum, presence of paired posterior spines on the mesonotum, metanotum, and abdominal segments I–IV, as well as having the armature of the extremities considerably more pronounced. Due to the great intraspecific variability in both species, the distinction of females is more difficult. In general, however, females of this new species can be differentiated from those of *S. bouladoui* sp. nov. by the averaging smaller size, generally much more developed body armature which comprises a notably larger posterior pair of spines on the pronotum, that usually projects higher than the head, presence of paired posterior spines on the mesonotum and metanotum (sometimes very indistinct and almost obsolete) and having the dorsal carinae of the mesotibiae and metatibiae distinctly lobate or dentate. As in males the leg armature is considerably more strongly developed. Eggs differ from those of *S. bouladoui* sp. nov. by the considerably larger and rounded, almost hemispherical capitulum as well as the averaging darker and more decidedly flecked colouration of the capsule (Fig. 6).

*Material examined.* HT, ♂: Dominican Republic, RD–044 La Sal, Reserva Científica Ébano Verde, La Vega Prov., 11–12.vii.2002, 19°04.101' N 70°34.089' W, 1,043 m, D. Perez, B. Hierro, R. Bastardo [USNM].

PT, 2 ♂: Dominican Republic, RD–0218, 1 km ESE Cortico, Barahona Prov., 1347 m, 18° 06.520' N 71°12.898' W, 9–10.iv.204, D. Perez, B. Hierro, R. Bastardo. (d/n) [USNM].

PT, 2 ♂: Dominican Republic, RD–166, La Travesía, Eastern Sierra de Bahoruco, Barahona Prov., near Larimar mine, 18°07.163' N 71°08.505' W, 850 m, 29.vii.2003, D. Perez, R. Bastardo, B. Hierro. (night) [USNM].

PT, 2 ♂♂: Dominican Republic, RD–013, 18.i.02 La Mina de Cortico, Monteada Nueva, Barahona Prov., 1250 m, 264–773 mE 203–753 mN, Night, RB, SM, DO, DP. [USNM].

PT, 24 ♂♂, 20 ♀♀: *Dominican Republic, RD-044 La Sal, Reserva Científica Ébano Verde, La Vega Prov.*, 11-12.vii.2002, 19°04.101' N 70°34.089' W, 1,043 m, D. Perez, B. Hierro, R. Bastardo [USNM].

PT, 2 ♂♂, 1 ♂ (n3), 2 ♀♀ (n4): *Dominican Republic, RD-042, Arroyazo, Reserva Científica Ébano Verde, La Vega Prov.*, 19°01.945' N 70° 32.493' W, 9-10.vii.2002, 3,500 ft. D. Perez, B. Hierro, R. Bastardo [USNM].

PT, 10 ♂♂, 5 ♀♀, 1 ♀ (n5): *Dominican Republic, RD-151, La Sal, Reserva Ébano Verde, La Vega Prov.*, 19°04.101' N 70°34.089' W, 1,043 m, 12.vii.2003, D. Perez, R. Bastardo, B. Hierro. (night) [USNM].

PT, 2 ♂♂: *Dominican Republic, RD-149, Loma La Golondrina, Reserva Ébano Verde, La Vega Prov.*, 19°03.398' N 70°32.670' W, 11.vii.2003, D. Perez, R. Bastardo, B. Hierro. (day/night) [USNM].

PT, ♀: *Dominican Republic, RD-045 Paso de la Perra, nr. La Ciénaga, La Vega Prov.*, 19°04.376' N 70°49.623' W, 16.vii.2002, D. Perez, B. Hierro, R. Bastardo, S. Medrano, H. Takizawa [USNM].

PT, 6 ♂♂, 6 ♀♀, 1 ♀ (n4), 13 eggs: *Dominican Republic, RD-043, On trail Arroyazo to La Sal, Reserva Científica Ébano Verde, La Vega Prov.*, 10.vii.202, 1,249 m; 19°02.374' N 70°32.684' W, 1,102 m, 19°02.021' N 70°32.584' W, D. Perez, B. Hierro, R. Bastardo [USNM].

PT, 2 ♂♂: *Dominican Republic, RD-021, 26-27.i.02, Arroyazo, Reserva Científica Ébano Verde, La Vega Prov.*, 990 m, 19°02.27' N 70°32.64' W, RB, BH, DP. [USNM].

PT, 9 ♂♂, 2 ♀♀, 1 ♀ (penultimate instar): *Dominican Republic, RD-022, 28-30.i.02, La Sal, Reserva Científica Ébano Verde, La Vega Prov.*, 1,010 m, 19°04.42' N 70°34.18' W, RB, BH, DP [USNM].

PT, 4 ♂♂: *Dominican Republic, RD-023, Loma Casabito, Reserva Científica Ébano Verde, La Vega Prov.*, 1,390 m, 340-522 mE 2106-146 mN, RB, BH, DP. [USNM].

PT, ♂: *Dominican Republic, RD-157, Los Tablones, Parque Armando Bermúdez, La Vega Prov.*, 19°03.308' N 70°53.049' W, 1,270 m, 23.vii.2003, D. Perez, R. Bastardo, B. Hierro. (night) [USNM].

PT, ♀: *Dominican Republic, La Vega Prov.*, La Sal, Reserva Científica Ébano Verde 2.vii.1992, 1,200 m, S. Navarro. [USNM].

PT, 3 ♂♂: *Dominican Republic, RD-025, 1-2.ii.02, Km 10 on Rd. to Los Anones, Ocoa Prov.*, 1070 m, 347-505 mE 2052-511 mN, RB, BH, DP. [USNM].

PT, ♂: *Dominican Republic, RD-029, 5.ii.02, Río Limpio, Elías Piña Prov.*, 720 m, 233-705 mE 2129-840mN, RB, BH, DP. [USNM].

PT, ♂: *Dominican Republic, RD-128, Around caseta La Sierrecita, PNAB, Santiago Prov.*, 752 m, 19°14.889' N 71°04.735' W, 9.iv.2003, D. Perez, R. Bastardo, B. Hierro. [USNM].

PT, ♂: *Dominican Republic, RD-114, La Nevera, Valle Nuevo, La Vega Prov.*, 18°41.943' N 70°35.995' W, 1.iv.2003, D. Perez, R. Bastardo, B. Hierro. (night) [USNM].

PT, ♂: *Dominican Republic, Parque Nac, J. A. Bermúdez, Río de los Negros, 7–8 iii 1999, R. Bastardo*. [USNM].

PT, ♂: *Dominican Republic, La Cueva de la Colonia, 2.7 km W La Colonia, S. Cristobal Prov., 26 x 1997 S. Navarro*. [USNM].

PT, ♂: *Dominican Republic, La Vega Prov., La Sal, Reserva Científica Ebano Verde, 2.vii.1992, 1,200 m S. Navarro* [USNM].

PT, ♂: *Dominican Republic, Pinar Parejo, Estación VIII, 10 ii 1998, D. Veloz, S. Navarro*. [USNM].

*Distribution* (Fig. 7). Hispaniola: Dominican Republic: Barahona Province, La Vega Province, Ocoa Province, Elías Piña Province, Santiago Province.

*Etymology*. The name (*armatum* lat. = armed) refers to the prominent dorsal spines on the thorax and basal abdominal segments of males of this new species. Masculine.

*Species description*. The colouration is described from photos of live specimens taken in the wild by the third author.

**Females** (♀♀; Figs. 1a–c). Small to medium sized for the genus (body length incl. subgenital plate 68.1–95.5 mm). General colour various shades of ochre, drab and mid to dark brown, often with a slight greenish wash and the major spines of the body green. Occasionally with bold pale cream to beige markings along lateral sides of body and with basal portions of femora and tibiae pale cream, or with irregular pale mottling on mesofemora and metafemora. Swellings on median segment and abdominal segment VI (if present) dark brown. Anterior surfaces of profemora and mesofemora pale red to orange; posterior surface of metafemora with a reddish wash.

*Head* (Fig. 3c). About as wide as long, widening towards the posterior, the vertex flattened and irregularly tuberclose to spinulose, the posterior margin somewhat raised and with a transverse row of slightly enlarged spiniform tubercles and at least one pair of slender and acutely pointed spines. Genae tuberclose. Eyes small, almost circular in outline, just moderately projecting and their length contained about 2.5x in that of genae. Antennae reaching to anterior margin of median segment and consisting of about 36 segments that are longest in the median portion of antennae; the sub-apical five or so segments strongly shortened. Scapus compressed dorsoventrally with interior lateral margin gently deflexed and convex in dorsal aspect, about 1.3x longer than wide. Pedicellus cylindrical and somewhat constricted at the apex.

*Thorax*. Pronotum roughly quadrate with anterior margin somewhat concave and the lateral margins with a prominent, concave excavation pre-medially; transverse median sulcus moderate and lateral portions with a distinct, vacillated furrow. Entire surface irregularly tuberclose to spinulose; 1–2 pairs of somewhat enlarged, spiniform tubercles just behind anterior margin, one pair of obtuse but distinct spines in front of transverse sulcus and a pair of very prominent, variably sized, sometimes composite, slightly anteriorly directed spines in posterior half (Fig. 3c). Mesothorax roughly parallel-sided. Mesonotum densely tuberclose to minutely spinulose and usually with 2–6 moderately sized, paired dorsal spines in the median section, a marginal row of variably sized spines along lateral margins and a pair of somewhat prominent spines at posterior margin; 4.5x longer than pronotum. Mesosternum with a prominent longitudinal median line that is irregularly set with prominent tubercles; otherwise with a scarce network of rugulae (Fig. 3a). Metanotum sculptured like mesonotum but without paired



spines and with a prominent pair of spines at posterior margin, rectangular and  $\frac{1}{2}$  the length of mesonotum. Metasternum irregularly tuberculose. Mesopleurae and metapleurae tuberculose and with a marginal row of somewhat distinct, slender and pointed spines.

*Abdomen.* Median segment a little more than  $\frac{2}{3}$  the length of metanotum, rectangular and with a pair of variably sized spines or a multispinose, lobate swelling at posterior margin. Segment II rectangular, somewhat longer than median segment and about 1.5x longer than wide. Segments III–VI slightly widening, VI the widest segment and VII distinctly narrowing and somewhat shorter than II. Tergum VI occasionally with lateral margins deflexed and convex and with a variably sized, posteriad directed swelling or struma, that may cover as much as half of tergum VII and can be as high as height of entire segment. Praeopercular organ formed by a pale cream, peg-like apically pointed protuberance that is anteriorly surrounded by a semi-circular ridge; positioned some distance off posterior margin of sternum VII. Tergites VII–X much shorter than preceding, IX shortest and sometimes with posterior margin deflexed to form two scale-like protuberances. Anal segment somewhat wider than long, with a fine longitudinal median carina, the posterior margin with a weakly concave excavation and another, more narrow concave excavation at bases of cerci. Epiproct, irregularly shaped, scale-like and with posterior margin denticulate. Cerci with tip gently incurved. Subgenital plate moderately bulgy in median portion, the apical half with a sharp, sometimes obtusely dentate and longitudinal median keel, the apex projecting beyond apex of abdomen by at least the length of anal segment and the apex obtusely triangular.

*Legs.* Profemora with posteroventral carina strongly deflexed and irregularly undulate, pre-medially often forming two somewhat enlarged lobes (Fig. 3c); medioventral carina tuberculose and anteroventral carina with 2–3 teeth in apical portion. Protibiae with dorsal carina distinctly lobulate. Mesofemora and metafemora with dorsal carinae (and the posteroventral carina of mesofemora) obtusely lobate-dentate, the anteroventral carina minutely tuberculate. Apex of mesofemora and metafemora with a prominent, slender dorso-apical spine that projects over knee joint. Medioventral carina of mesofemora and metafemora with 7–8 strong and long, gently back-curving spines; usually a very small spine between the larger spines. All carinae of mesotibiae and metatibiae irregularly lobate-dentate.

**Males** (♂♂; Fig. 1d). Small to medium to large for the genus (body length 51.1–65.7 mm), apterous and with a spiny body. Colour ranging from mid or dark green over drab and ochre to brown. Bases of all femora pale green and bases of tibiae with a greenish wash. Largest spines of the head and body ochre or reddish brown and often yellow or green tipped. Antennae ochre, often with a slight orange hue.

*Head* (Fig. 3d). Generally, as in ♀♀ but genae almost parallel-sided, tubercles much less pronounced and more obtuse, the vertex with a slightly impressed coronal line and posterior margin with four short black spines; the median pair often strongly enlarged, very slender and acutely pointed. Eyes projecting hemispherically, circular in outline and their diameter contained about 1.6x in length of genae. Antennae consisting of about 41 segments and reaching to abdominal segment III; scapus and pedicellus like in ♀♀. III somewhat longer than scapus, IV only about  $\frac{1}{3}$  the length of III.

*Thorax.* Pronotum about as long as wide, sculpturing of surface generally as in ♀♀ but the two pairs of spines decidedly more pronounced and the posterior pair in particular very large and more upright than in ♀♀ (Fig. 3d). Anterior margin with two spiniform tubercles. Mesothorax 5.2x longer and somewhat narrower than pronotum; very gently widened posteriorly. Mesonotum irregularly and to a very variable degree set with spiniform tubercles and

spines of different sizes; a very prominent pair of acute, upright spines at posterior margin. Metanotum a little less than half the length of mesonotum, armed with a few scattered spiniform tubercles or differently sized spines; a very prominent pair of acutely pointed spines at posterior margin. Mesopleurae and metapleurae armed with a few spiniform tubercles or variably sized spines; each with a prominent laterad directed supracoxal spine which is notably larger on metapleurae. Mesosternum with a distinct, obtuse longitudinal median carina that is set with a row of rounded to spiniform tubercles (Fig. 3b); metasternum sparsely tuberculate to spinulose.

*Abdomen.* Median segment half the length of metanotum, rectangular, with a pair of black spiniform tubercles medially and a prominent pair of acutely pointed spines at posterior margin. Segments II–VII gradually decreasing in length with VII only 3/5 the length of II; all roughly uniform in width. Tergites II–VII all with a pair of spines at posterior margin which decreases in size from II towards VII; size variable and often very obtuse on VI and VII. All these tergites additionally armed with a variable number of spiniform tubercles or small, slender spines and a moderately distinct posterolateral spine. Sternites II–VII with three pairs of spiniform tubercles or short spines. Tergum VIII trapezoidal with posterior margin distinctly wider than anterior margin, IX roughly equal in length with posterior margin considerably narrower than anterior margin. Anal segment much shorter than all preceding, wider than long, obtusely carinate medio–longitudinally and the posterior margin notched medially (Fig. 2h); the portions on each side of the median notch obtusely rounded, somewhat swollen and ventrally armed with a few very minute denticles. Lateral margins somewhat deflexed and obtusely rounded. Cerci small, compressed in basal portion with the apical portion obtuse and very gently incurving; slightly projecting over posterior margin of anal segment. Vomer small, triangular, asymmetrical and with the long and slender but sharply upcurving terminal hook somewhat displaced dextrally (Fig. 2i). Poculum small and not reaching to posterior margin of tergum IX, strongly convex and cup-shaped, the apical portion with two longitudinal, slightly converging keels and the posterior margin notched medially; base with a prominent, vacillate transverse keel (Fig. 2g).

*Legs.* All femora with a short but acute dorso–apical spine that slightly projects over the knee joint. Front legs unarmed except for a few small spiniform tubercles on apical half of medioventral carina. Mesofemora and metafemora with all four outer carinae minutely and irregularly tuberculate to denticulate (ventral carinae of metafemora mostly with three short sub–apical spines); the medioventral carina armed with 3–6 prominent, long and slender, gently backcurving spines that increase in size towards the apex of femur (often with single much smaller intervening spines). Mesotibiae and metatibiae with all carinae very minutely denticulate.

*Measurements [mm].* ♂, HT: Body 60.5, pronotum 2.6, mesonotum 14.7, metanotum 9.9, median segment 3.1, profemora 11.4, mesofemora 10.1, metafemora 12.6, protibiae 12.2, mesotibiae 9.8, metatibiae 12.6, antennae > 36.

**Males** (♂♂), PT: *Body* 51.1–65.7, pronotum 2.2–2.6, mesonotum 12.4–15.2, metanotum 8.3–10.4, median segment 2.8–3.9, profemora 9.6–11.1, mesofemora 8.7–10.5, metafemora 11.2–13.0, protibiae 10.0–11.7, mesotibiae 7.8–9.4, metatibiae 10.3–13.3, antennae > 33.

**Females** (♀♀), PT: *Body (including subgenital plate)* 71.3–99.1, body 68.1–95.5, pronotum 3.4–4.0, mesonotum 15.3–21.9, metanotum 12.2–15.9, median segment 4.8–6.6, profemora 9.7–11.8, mesofemora 10.0–12.5, metafemora 12.4–15.4, protibiae 9.6–11.8, mesotibiae 9.8–12.1, metatibiae 13.1–14.4, antennae > 34.

*Egg* (Fig. 6d–f). Elongate–ovoid, 1.6x longer than wide and 2x longer than high, the dorsal surface somewhat more convex than ventral or lateral surfaces. Micropylar plate slightly less than half the length of capsule, longer than wide, the posterior half strongly widened and about 1.5x wider

than anterior half. Outer margin slightly swollen and raised, the inner surface flat and sculptured like capsule. Micropylar cup distinct, cup-shaped and with a very shallow swelling anteriorly; positioned in a wide median notch of posterior end of plate. Operculum roughly circular, flat and with a large almost hemispherical capitulum in centre that has a shallow central pit on top. The outer portion with a conspicuous ring that is placed on many small stalks and resembles a water wheel. Capsule surface strongly shiny, ochraceous to mid brown and to a variable degree flecked with pale cream or grey. Outer margin of micropylar plate brown, capitulum greyish mid brown. Measurements [mm]: length (including capitulum) 3.7–4.2, length 3.4–3.7, width 1.7–1.9, height 1.9–2.2, length of micropylar plate 1.1–1.8.

*Comments.* Both sexes show an impressive range of intraspecific variability in colouration and morphology. In addition to a variable overall colouration, males show notable variability in the number and size of the spines of the body. Females range from being almost plain (except for the typical posterior pair of spines on the pro-, meso- and metanotum) to having the mesonotum and metanotum and pleurae set with a variable number of differently sized spines. The paired posterior spines of the thoracic nota are also variable in size and may be very small or even almost obsolete on the mesonotum and metanotum. The posterior pair of spines on the pronotum may sometimes even be composite and occasionally there is a further, but notably smaller pair of spines, just in front of the transverse median sulcus. The posterior margin of the head usually bears a transverse row of 2–4 spines that also vary considerably in size. Some specimens have a multi-spinose to lobulate swelling on the median segment and have a very prominent, irregularly shaped lobe-like projection on abdominal tergum VI, which can be very large and extend posteriorly more than half way over tergum VII and vertically extend by more than the height of the entire segment (Figs. 2a–d). The leg armature as well shows noteworthy variability.

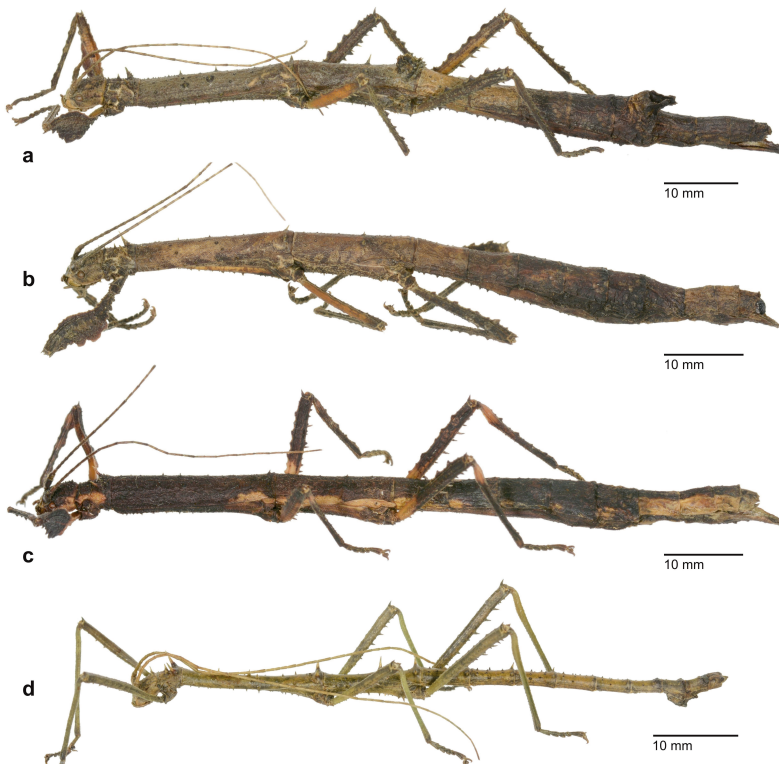


Figure 1. *Sigaruphasma armatum* sp. nov. habitus of adult insects. a, ♀ PT from RD-044 [USNM]; b, ♀ PT from RD-043 [USNM]; c, ♀ PT from RD-044 [USNM]; d, ♂ HT from RD-044 [USNM].

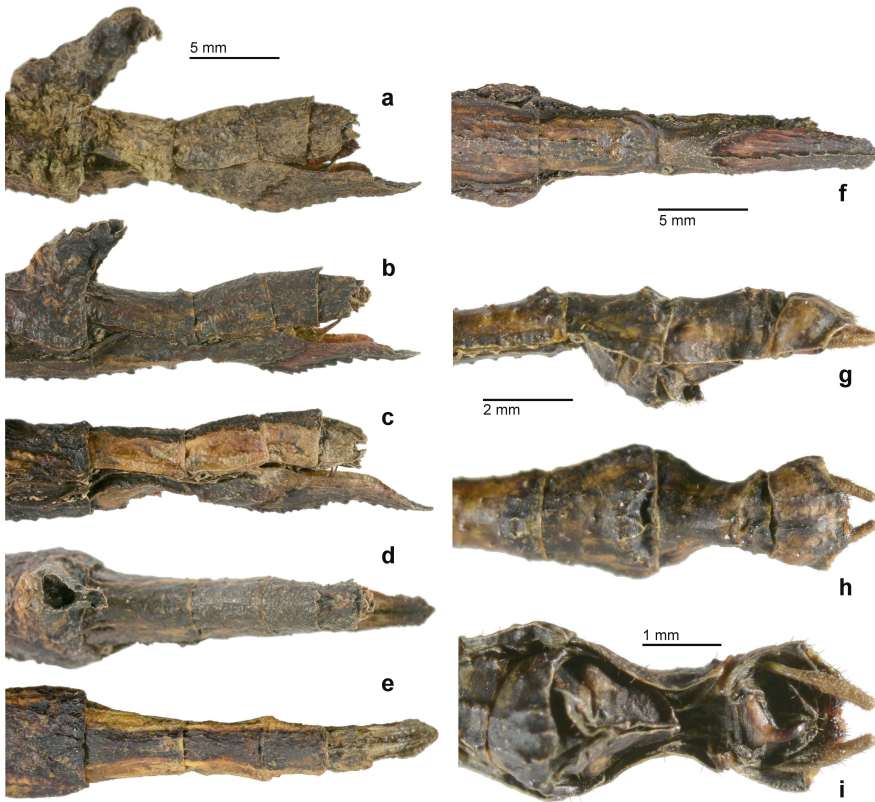


Figure 2. *Sigaruphasma armatum* sp. nov. terminal abdominal segments. a, ♀ PT lateral view [USNM]; b, ♀ PT lateral view [USNM]; c, ♀ PT lateral view [USNM]; d, ♀ PT dorsal view [USNM]; e, ♀ PT dorsal view [USNM]; f, ♀ PT ventral view [USNM]; g, ♂ PT lateral view [USNM]; h, ♂ PT dorsal view [USNM]; i, ♂ PT ventral view [USNM].

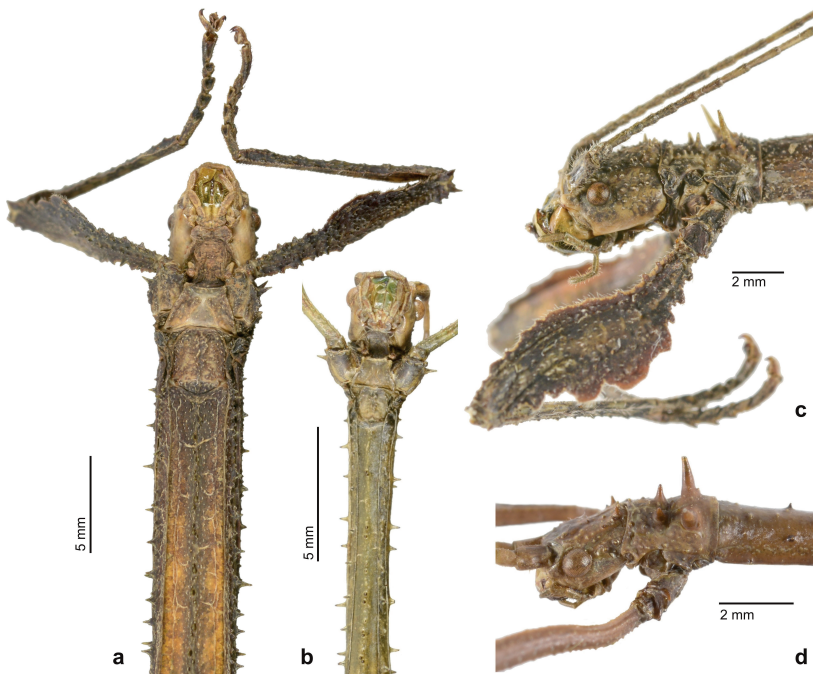


Figure 3. *Sigaruphasma armatum* sp. nov. details of head and thorax. a, ♀ PT ventral view of head, pro- and mesosternum [USNM]; b, ♂ PT ventral view of head, pro- and mesosternum [USNM]; c, ♀ PT lateral view of head, pronotum and front legs [USNM]; d, ♂ PT lateral view of head, pronotum and front legs [USNM].

***Sigaruphasma bouladoui* sp. nov.**

Figures 4, 5, 6 a–c, 7, 8 b–e

*Diagnosis of species.* Medium to large for the genus. Female: Elongate, slender with none of the abdominal segments considerably widened. Colour various shades of ochre, grey or brown, occasionally with irregular white or pale cream markings or faint longitudinal lines; mesosternum somewhat reddish and anterior surface of mesofemora dull orange to pale red. Median segment and abdominal tergum VI often with a struma or foliaceous projection at posterior margin. Posteroventral carina of profemora very strongly deflexed and irregularly undulate, protibiae undulate to lobate. Mesofemora and metafemora with dorsal carinae undulate and all three ventral carinae spinose. Male: Slender with strongly conical tegmina and well-developed alae, that reach to abdominal segment VI. No posterior spines on mesonotum and metanotum or basal abdominal tergites. Colour pale to mid brown or greyish and occasionally with white to pale cream markings; anterior surface of mesofemora dull orange to red. Mesofemora strongly compressed laterally.

*Diagnosis de la especie.* De tamaño medio a grande para el género. Hembra: Alargada, esbelta, ninguno de los segmentos abdominales considerablemente ensanchado. Coloración en tonos ocres, grises o marrones, en ocasiones con marcas irregulares o líneas longitudinales difusas de color blanco o crema; mesosterno más o menos rojizo y la superficie anterior de los mesofémures de naranja a rojo pálido. Segmento medio y terguito abdominal VI generalmente con una proyección foliácea en el margen posterior. Carinas posteroventrales de los profémures fuertemente desviadas e irregularmente onduladas, protibias entre onduladas y lobuladas. Mesofémur y metafémur con una carina dorsal ondulada y las tres carinas ventrales espinosas. Macho: Esbelto, con las tegminas cónicas y alas bien desarrolladas, que alcanzan el segmento abdominal VI. Terguitos abdominales, mesonoto y metanoto sin espinas posteriores. Coloración en tonos claros de marrón a grisáceo, en ocasiones con marcas en blanco o crema; superficie anterior de los mesofémures de naranja a rojizo. Mesofémures fuertemente comprimidos lateralmente.

*Differentiation.* Males readily differ from *S. armatum* sp. nov. by being winged, having short and cone-shaped tegmina and fully developed alae that reach as far back as to abdominal segment VI. Furthermore, they differ from that species by the generally much less developed body spination, much smaller posterior pair of spines on the pronotum, lacking paired posterior spines on the mesonotum, metanotum, and abdominal segments I–IV, as well as having the armature of the extremities notably less pronounced. The distinction of females is less obvious, because both species show a remarkable range of intraspecific variability. In general, however, females of this new species can be differentiated from those of *S. armatum* sp. nov. by the averaging larger size, generally much less developed body armature which comprises a smaller posterior pair of spines on the pronotum, that never considerably projects higher than the head, entire lack of paired posterior spines on the mesonotum and metanotum and having at best very small denticles or tubercles on the dorsal carinae of the mesotibiae and metatibiae (distinctly lobate or dentate in *armatum*). Furthermore, as in males the leg armature is less developed. Eggs differ from those of *S. armatum* sp. nov. by the noticeably smaller and more conically shaped capitulum as well as the averaging paler and often more ochre colouration of the capsule (Fig. 6).

*Material examined.* HT, ♂: Dominican Republic, RD–092, Blanco, nr. hydroelectric, Bonao, Monseñor Nouel Prov., 18°52.946' N 70°30.337' W, 19.iii.2003, D. Perez, R. Bastardo, B. Hierro. (night) [USNM].

PT, 5 ♂♂, 6 ♀♀: Dominican Republic, RD–092, Blanco, nr. hydroelectric, Bonao, Monseñor Nouel Prov., 18°52.946' N 70°30.337' W, 19.iii.2003, D. Perez, R. Bastardo, B. Hierro. (night) [USNM].

PT, 5 ♂♂, 6 ♀♀: *Dominican Republic, RD-093 ~5 km E Federación Campesinos de Blanco, Bonaò, Monseñor Nouel Prov., 577 m, 18°52.445' N 70°30.326' W, 19.iii.2003, D. Perez, R. Bastardo, B. Hierro. (night) [USNM].*

PT, 2 ♂♂, 1 ♀, 1 ♀ (n4): *Dominican Republic, RD-003, 13.i.02 ~1 km N La Colonia, San Cristóbal Prov., rd edge, 690 m, 369–665 mE 2044–438 mN, RB, DO, DP. [USNM].*

PT, 1 ♂, 4 ♀♀, 1 ♀ (penultimate instar): *Dominican Republic, La Colonia, San Cristóbal Province, 18°28.85' N 70° 14.07' W, 24.ix.1999, D. Perez, R. Bastardo, L. Ramos [USNM].*

PT, 1 ♂ (open wings), 1 ♀: *Dominican Republic, RD-073 La Colonia, San Cristóbal Prov., 773 m, 18°31.167' N 70°16.740' W, 26.xi.2002, D. Perez, B. hierro, R. Bastardo, (night) [USNM].*

PT, 1 ♀: *Dominican Republic, RD-072 ~5 km N La Colonia, San Cristobal Prov., 566 m, 18°31.167' N 70°16.740' W, 26.xi.2002, D. Perez, B. Hierro, R. Bastardo, (night) [USNM].*

PT, 1 ♂: *Dominican Republic, La Palma, San Cristóbal Prov., camino al arroyo, 880 m, 357–776 mE, 2057–713 mN, 3.i.2002, Night R. H. Bastardo [USNM].*

PT, 1 ♂, 1 ♀: *Dominican Republic, RD-025, 1–2.ii.02, Km 10 on Rd. to Los Anones, Ocoa Prov., 1070 m, 347–505 mE 2052–511 mN, RB, BH, DP [USNM].*

PT, 1 ♀: *Dominican Republic, RD-021, 26–27.i.02, Arroyazo, Reserva Científica Ebano Verde, La Vega Prov., 990 m, 19°02.27' N 70°32.64' W, RB, BH, DP [USNM].*

PT, 1 ♂: *Dominican Rep., La Vaca, 6km. W. of Jayaco, 2 June 1969, Flint & Gomez [USNM].*

PT, 1 ♂, 3 ♀♀: *Dominikanische Republik: Samana peninsula, 12 km from “Las Terrenas” direction “Sanchez”, leg. Christian Bouladou Dupre 2012 [coll. OC].*

PT, 27 ♂♂, 22 ♀♀, 32 eggs: *ex Zucht F. Hennemann 2014–2016, Herkunft: Hispaniola, Dominikanische Republik, Samaná Prov., 12 km Str. Terrenas > Sanchez, leg. C. Bouladou–Dupré 2012 [coll. FH, No' s 0842–1 to 49, E].*

PT, 3 ♂♂, 4 ♀♀, 2 eggs: *Ex Zucht: B. Kneubühler 2013, Dominikanische Republik: Samana peninsula, 12 km from “Las Terrenas” direction “Sanchez”, Gen F1, leg. Christian Bouladou Dupre 2012 [coll. OC, OC-0368–1 to OC-0368–8].*

PT, 8 ♂♂, 3 ♀♀ (nymph): *Ex Zucht: O. Conle 2013, Dominikanische Republik: Samana peninsula, 12 km from “Las Terrenas” direction “Sanchez”, Gen F1, leg. Christian Bouladou Dupre 2012 [coll. OC, OC-0368–9 to OC-0368–22].*

PT, 4 ♂♂, 1 ♀♀, 19 eggs: *Ex Zucht: O. Conle 2018, Dominikanische Republik: Samana peninsula, 12 km from “Las Terrenas” direction “Sanchez”, Gen F1, leg. Christian Bouladou Dupre 2012 [coll. OC, OC-0368–23 to OC-0368–27].*

*Distribution* (Fig. 7). Hispaniola: Dominican Republic, Monseñor Nouel Province, San Cristóbal Province, Ocoa Province, la Vega Province and Samaná Province.

*Etymology.* This new species is dedicated to Christian Bouladou Dupré (Martinique), who collected livestock of this species and forwarded eggs to European breeders.

*Species description.* The colouration is described based on live captive reared specimens and photos taken of live specimens in the wild by the third author.

**Females** (♀♀; Figs. 4a–c). Medium to large for the genus (body length incl. subgenital plate 85.5–108.0 mm). General colour various shades of ochre, drab and brown, sometimes with a slight orange wash and occasionally with faint longitudinal dark stripes along dorsal body surface or with several faint but bold pale cream to white markings. Swellings on median segment and abdominal segment VI (if present) dark brown. Anterior surface of mesofemora orange (Fig. 8b).

*Head* (Fig. 5i). About as wide as long, widening towards the posterior, the vertex flattened, in posterior portion with a slightly impressed coronal line and irregularly tuberclose, the posterior margin somewhat raised and with a transverse row of slightly enlarged tubercles. Genae tuberclose and with a slight, longitudinal postocular furrow. Eyes small, sub-circular in outline, just moderately projecting and their length contained about 2x in that of genae. Antennae reaching to median segment and consisting of about 36 segments that are longest in the median portion of antennae. Scapus compressed dorsoventrally with interior lateral margin somewhat deflexed and rounded, about 1.5x longer than wide. Pedicellus cylindrical and somewhat constricted towards apex.

*Thorax.* Pronotum wider than long with anterior margin notably concave and the transverse median sulcus very distinctly impressed, curved and expanding over entire width of segment; entire surface irregularly tuberclose. A pair of somewhat enlarged, spiniform tubercles just in front of transverse sulcus and a pair of variably sized, slightly anteriorly directed spines in posterior half (Fig. 5i). Mesothorax slightly swollen pre-medially. Mesonotum densely granulose and sometimes with a few enlarged, dark brown to black tubercles; 4.2x longer than pronotum. Mesosternum rugulose only along the median line (Fig. 5j). Metanotum sculptured like mesonotum but without enlarged tubercles, rectangular and 2/5 the length of mesonotum. Mesopleurae and metapleurae tuberclose and with a marginal row of slightly pronounced, spiniform tubercles.

*Abdomen.* Median segment about 3/5 the length of metanotum, gently narrowed medially; sometimes with a lobe or scale-like swelling at posterior margin. Segment II rectangular, about equal in length to median segment and 1.5x longer than wide. Segments II–V slightly widening, VI–VII narrowing, almost uniform in width and somewhat shorter than II. Tergum VI occasionally with a variably sized swelling or struma at posterior margin. Praeopercular organ formed by a peg-like protuberance, followed by a longitudinal furrow near posterior margin of sternum VII. Tergites VII–X much shorter than preceding, IX shortest and sometimes with two small swellings at posterior margin. Anal segment somewhat wider than long, with a fine longitudinal median carina, the posterior margin with a concave excavation and another, more narrow concave excavation at bases of cerci. Epiproct irregularly shaped, scale-like and with a posteromedian indentation. Cerci with tip gently incurved. Subgenital plate moderately bulgy in median portion, the apical half with a sharp longitudinal median keel, the apex projecting beyond apex of abdomen by at least the length of anal segment and the apex obtusely triangular.

*Legs.* Profemora with posteroventral carina strongly deflexed and irregularly undulate, pre-medially often forming two somewhat enlarged lobes (Fig. 5i); medioventral carina tuberclose and anteroventral carina with 2–3 minute teeth in apical portion. Protibiae with a few very small and indistinct lobules. Mesofemora and metafemora with dorsal carinae undulate and the two outer ventral carinae dentate with the teeth increasing in size towards the apex. Medioventral carina of mesofemora with 5–6 slender, moderately sized spines, the median ones

of which the largest; in metafemora armed with 9–10 prominent, long and very slender, gently back-curving spines. Dorsal carinae of mesotibiae and metatibiae tuberculose and sometimes with a few very small lobulae, the ventral carinae minutely tuberculose.

**Males** (♂♂; Figs. 4d–e). Medium to large for the genus (body length 62.0–75.5 mm) with fully developed alae (length 33.0–38.0 mm). Colour drab to ochraceous or greyish mid brown, great parts of tegmina and costal region of alae chestnut brown. Head and tibiae sometimes with a greenish hue. Apical portion of tegmina and basal half of costal region of alae anterior to the radial vein mid to dull green; the conical central hump of the tegmina and base of the alae dark brown. Anal fan of alae greyish yellow irregularly tessellated with dark grey. Anterior surface of mesofemora orange.

*Head.* Generally, as in ♀♀ but genae almost parallel-sided, tubercles less pronounced and more obtuse and the eyes relatively larger, projecting hemispherically, circular in outline and their diameter contained only about 1.6x in length of genae. Antennae consisting of 52 segments and reaching to abdominal segment IV; scapus and pedicellus like in ♀♀. III somewhat longer than scapus and IV.

*Thorax.* Pronotum about as long as wide with the anterior and posterior margins strongly curved. Sculpturing of surface generally as in ♀♀ but the two pairs of spines more pronounced and the posterior pair much larger and more upright than in ♀♀; all with the tip pale orange. Anterior margin with four rounded tubercles. Mesothorax 4.3x longer and somewhat narrower than pronotum; very gently widened in the posterior portion. Mesonotum irregularly set with tubercles of variable sizes, single ones may be conspicuously enlarged, spiniform and orange-tipped. Mesosternum with a distinct, obtuse and granulose longitudinal median keel, the lateral portions smooth (Fig. 5k); median keel very indistinct on metasternum, which bears one or two pairs of black granules. Mesopleurae tuberculose and with a prominent, pointed somewhat ventrad and posteriad directed supracoxal spine. Tegmina slightly projecting over posterior margin of metanotum and prominently conical with a fairly acute central spine; the basal portion notably narrowed and the posterior margin obtusely rounded. Alae reaching to abdominal segment VI.

*Abdomen.* Median segment about 1.2–1.3x longer than metanotum, smooth. Segments II–VII gradually decreasing in length with VII only 3/5 the length of II; all roughly uniform in width. Tergites II–VII all with a fine longitudinal median keel, II–V smooth, VI and VII granulose to minutely tuberculose and posteromedially with a pair of short, sub-parallel ridges. Sterna with a few scattered granulose along median line. Tergum VIII trapezoidal with posterior margin distinctly wider than anterior margin, IX roughly equal in length with posterior margin considerably narrower than anterior margin. Anal segment much shorter than all preceding, wider than long with a fine longitudinal median carina dorsally and the posterior margin notched medially (Fig. 5g); the portions on each side of the median notch obtusely rounded, somewhat swollen and ventrally armed with a few minute denticles. Lateral margins somewhat angular and deflexed. Cerci small, compressed dorsoventrally in basal portion with the apical portion obtuse and slightly incurved. Vomer small, roughly triangular, flat and with the short but strongly upcurving terminal hook somewhat dextral directed (Fig. 5h). Poculum strongly convex and obtusely conical, the apical portion with three longitudinal, sub-parallel ridges and the posterior margin triangularly excavated medially; an obtuse median projection at the base (Fig. 5f).



*Legs.* Front legs unarmed and only profemora with a few small tubercles on medioventral carina. Mesofemora with the two outer ventral carinae minutely denticulate and the medioventral carina armed with 5–6 slender but distinct spines; otherwise unarmed. Metafemora strongly swollen and thickened, the two outer ventral carinae denticulate and the medioventral carina armed with 7–8 slender but fairly prominent spines that increase in size towards the apex of femur; dorsal carinae smooth. All tibiae simple and unarmed.

*Measurements [mm].* ♂, HT: Body 69.7, pronotum 2.7, mesonotum 13.1, metanotum 10.6, tegmina 6.7, alae 37.3, profemora 10.3, mesofemora 9.6, metafemora 13.7, protibiae 10.0, mesotibiae 8.3, metatibiae 11.6, antennae >35.

**Males** (♂♂), PT: *Body* 62.0–75.5, pronotum 2.4–2.9, mesonotum 11.2–13.8, metanotum 4.6–4.9, median segment 5.5–5.9, tegmina 5.9–7.2, alae 33.0–38.0, profemora 9.7–11.0, mesofemora 8.7–10.0, metafemora 11.5–14.2, protibiae 8.8–10.8, mesotibiae 7.1–9.2, metatibiae 11.3–12.5, antennae 39.0–43.0.

**Females** (♀♀), PT: *Body (including subgenital plate)* 85.5–108.0, body 83.0–103.5, pronotum 3.6–3.8, mesonotum 16.6–20.5, metanotum 7.2–10.3, median segment 5.0–6.8, profemora 9.8–13.6, mesofemora 9.8–14.0, metafemora 13.2–18.0, protibiae 8.6–11.6, mesotibiae 7.9–11.2, metatibiae 12.3–16.9, antennae 35.0–43.0.

*Egg* (Figs. 6a–c). Elongate–ovoid, 1.6x longer than wide and 2x longer than high, the dorsal surface distinctly more convex than ventral or lateral surfaces. Micropylar plate a little less than half the length of capsule, longer than wide, the posterior half strongly widened and about 1.5x wider than anterior half. Outer margin obtusely swollen and raised, the inner surface flat and somewhat impressed towards the outer margin; sculptured like capsule. Micropylar cup distinct, cup-shaped and with a small, blackish hemispherical swelling anteriorly; positioned in a wide median notch of posterior end of plate. Operculum almost circular, flat and with a obtusely conical capitulum in centre that has a shallow central pit. The outer portion with a conspicuous ring that is placed on many small stalks and resembles a water wheel. Capsule surface strongly shiny, reddish pale to mid brown or chestnut brown and prettily marbled and flecked with pale cream. Outer margin of micropylar plate brown, capitulum reddish brown. Measurements [mm]: length (including capitulum) 3.8–4.1, length 3.3–3.9, width 1.7–2.3, height 1.9–2.0, length of micropylar plate 1.3–1.8.

*Comments.* Both sexes show considerable variability in colouration and morphological variability is seen in females. While most females at hand have an unarmed body, some 25 % have a conspicuous posterior swelling on abdominal tergum VI which is variable in size and shape; it ranges from a small rugulose hump to a very large and strongly raised struma with a posteriad directed angularly cup-like carina that extends over the posterior margin of tergum VI. Occasionally there also is a small transverse and scale-like lobe at the posterior margin of the median segment (tergum I), which however is only present in specimens that also exhibit a swelling on tergum VI. While most specimens are fairly plain in colour, some may have faint longitudinal dark stripes along the dorsal surface of the body or have several bold pale cream to white markings. Males do not show any noticeable polymorphism but may exhibit large whitish markings on their bodies like those seen in certain females.

Stock was collected in 2012 along a small road some 12 km from Las Terrenas towards Sánchez on the Samaná Peninsula (Samaná Province) in the very north-eastern Dominican Republic by Christian Boloudou Dupré. Eggs were sent to Bruno Kneubühler (Luzern, Switzerland), who first reared this species in captivity in 2013 and forwarded culture-stock to the authors. In captivity in Europe bramble (*Rubus fruticosus*, Rosaceae),

raspberry (*Rubus idaeus*, Rosaceae), roses (*Rosa* spp., Rosaceae), oak (*Quercus robur*, Fagaceae) and salal (*Gaultheria shallon*, Ericaceae) are accepted as alternative food plants. In the Dominican Republic *S. bouladoui* sp. nov. appears to feed at least on *Piper* sp. (Piperaceae) but it is estimated that several other plants are part of its natural diet (pers. comm. with Christian Bouladou Dupré). Breeding is easy in moderately humid and well-ventilated conditions at average temperatures of 25 °C. The hatching rates of eggs are high (> 50 %) and incubation takes some four months at temperatures of 20–25 °C. Females reach maturity after 4,5–5 months, males in about four months. Females produce an average of 10–15 eggs per week, which are flicked away by an abrupt movement of the abdomen. If disturbed, both sexes will frequently drop to the ground and quickly walk away. While females sometimes remain motionless with all their legs held close to the body, males may sometimes be observed flashing their wings and will sometimes make use of their capability of active flight.

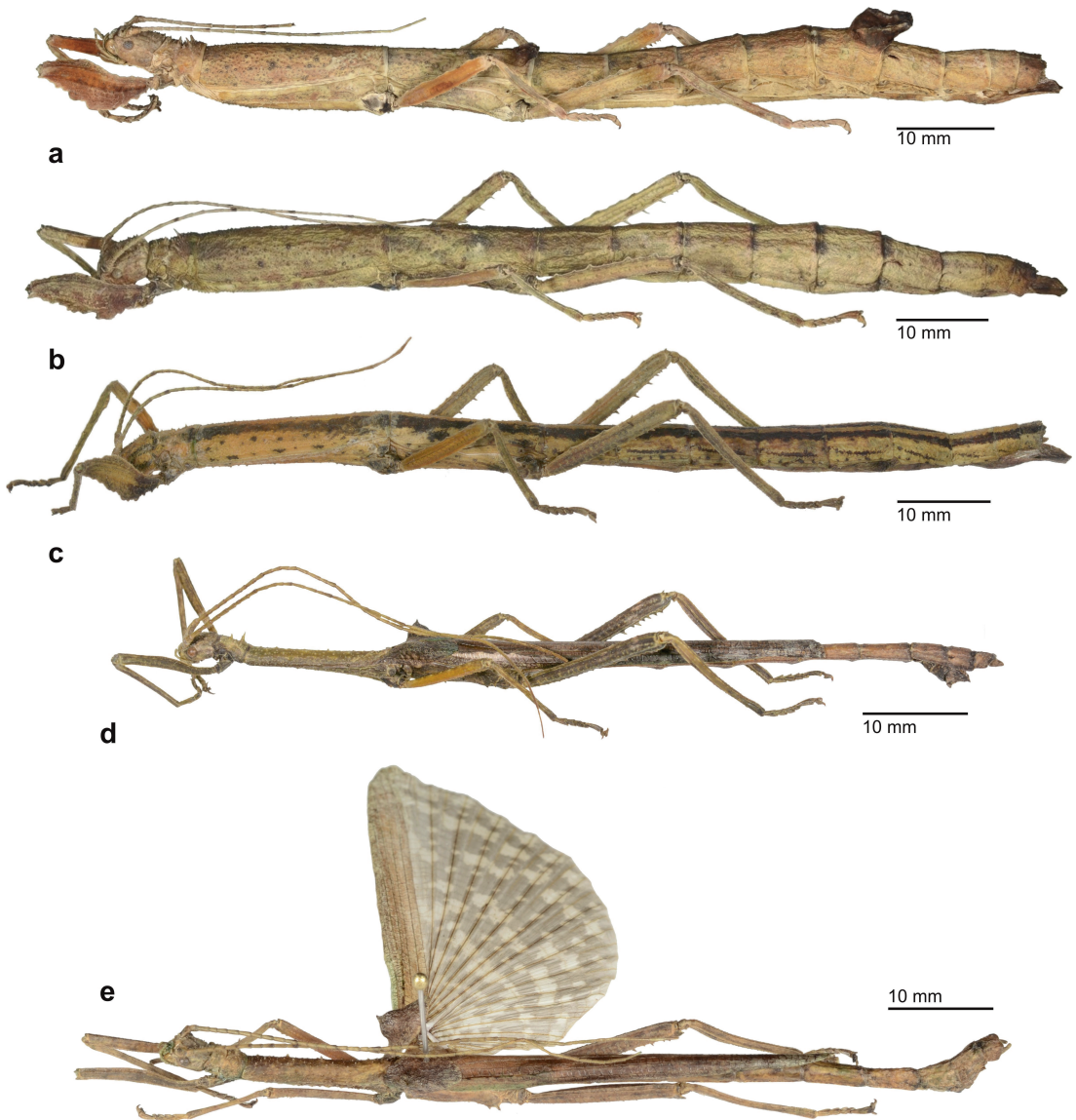


Figure 4. *Sigaruphasma bouladoui* sp. nov. habitus of adult insects. a, ♀ PT [coll. FH, No. 0842-1]; b, ♀ PT [coll. FH, No. 0842-2]; c, ♀ PT from RD-073 [USNM]; d, ♂ HT from RD-092 [USNM]; e, ♂ PT [coll. FH, No. 0842-9].

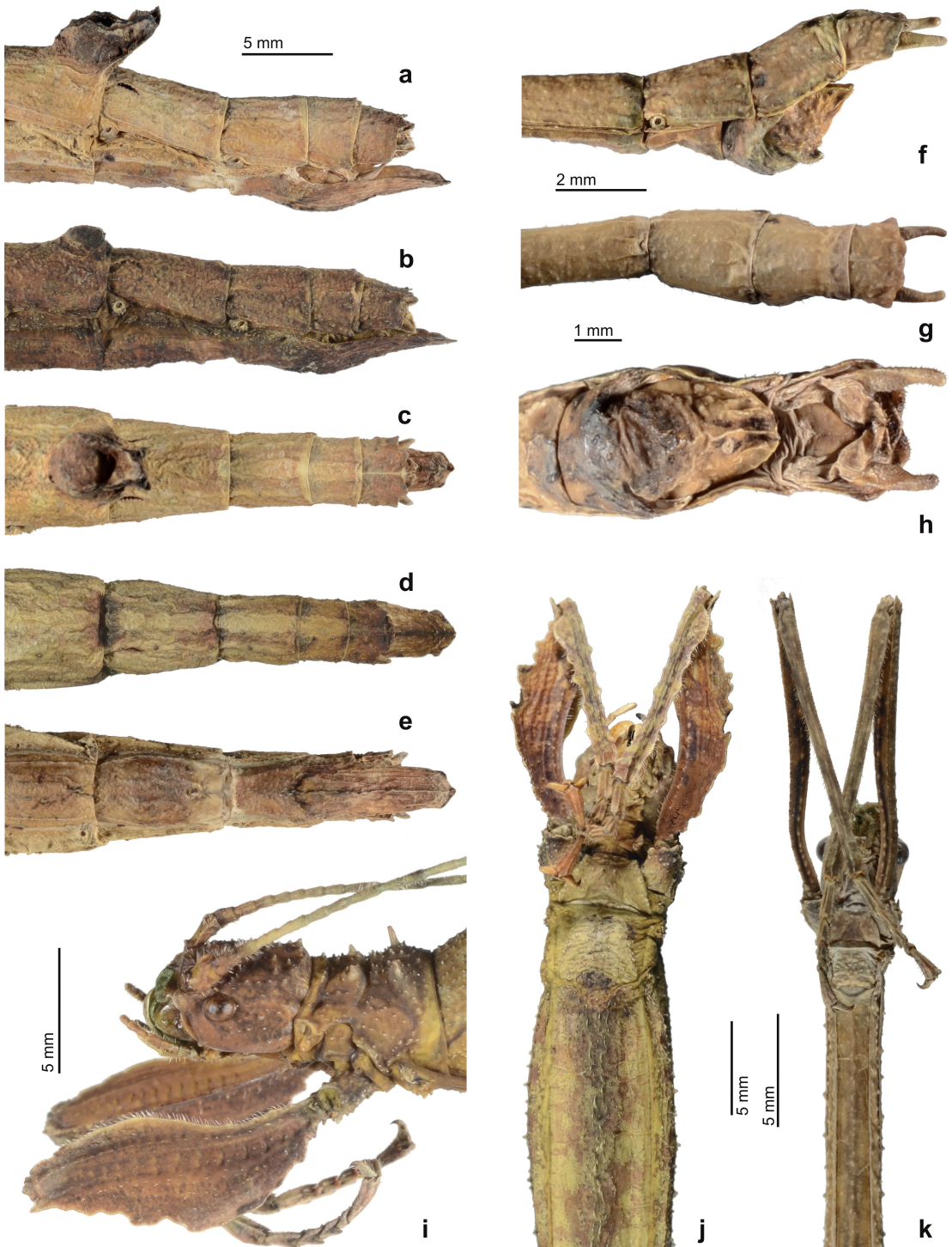


Figure 5. *Sigaruphasma bouladoui* sp. nov. details. a, ♀ PT lateral view [coll. FH]; b, ♀ PT lateral view [coll. FH]; c, ♀ PT dorsal view [coll. FH]; d, ♀ PT dorsal view [coll. FH]; e, ♀ PT ventral view [coll. FH]; f, ♂ PT lateral view [USNM]; g, ♂ PT dorsal view [USNM]; h, ♂ PT ventral view [coll. FH]; i, ♀ PT lateral view of head, pronotum and front legs [coll. FH]; j, ♀ PT ventral view of head, pro- and mesosternum [coll. FH]; k, ♂ PT ventral view of head, pro- and mesosternum [coll. FH].

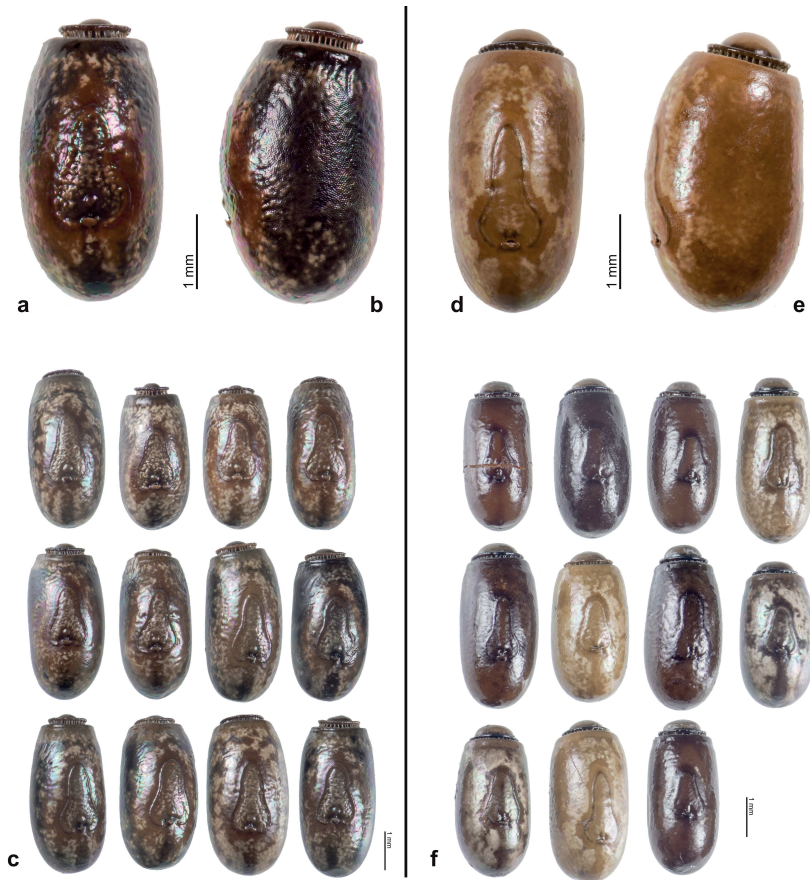


Figure 6. *Sigaruphasma* spp. eggs. a, *S. bouladoui* sp. nov. dorsal view; b, *S. bouladoui* sp. nov. lateral view; c, *S. bouladoui* sp. nov., twelve eggs showing morphological variability; d, *S. armatum* sp. nov. dorsal view; e, *S. armatum* sp. nov. lateral view; f, *S. armatum* sp. nov., eleven eggs showing morphological variability.

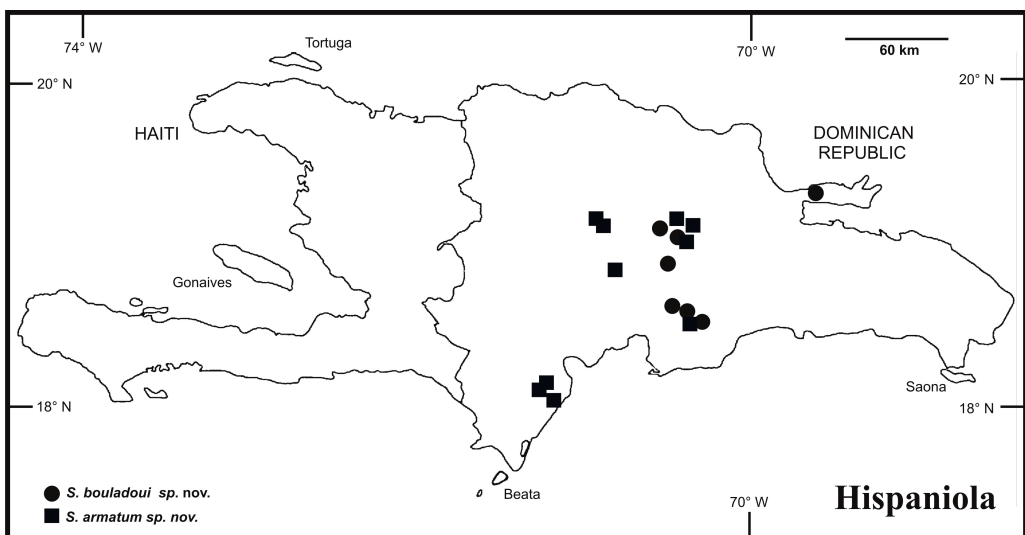


Figure 7. Map showing the distribution of *Sigaruphasma* gen. nov. on Hispaniola and known records of *S. armatum* sp. nov. and *S. bouladoui* sp. nov.

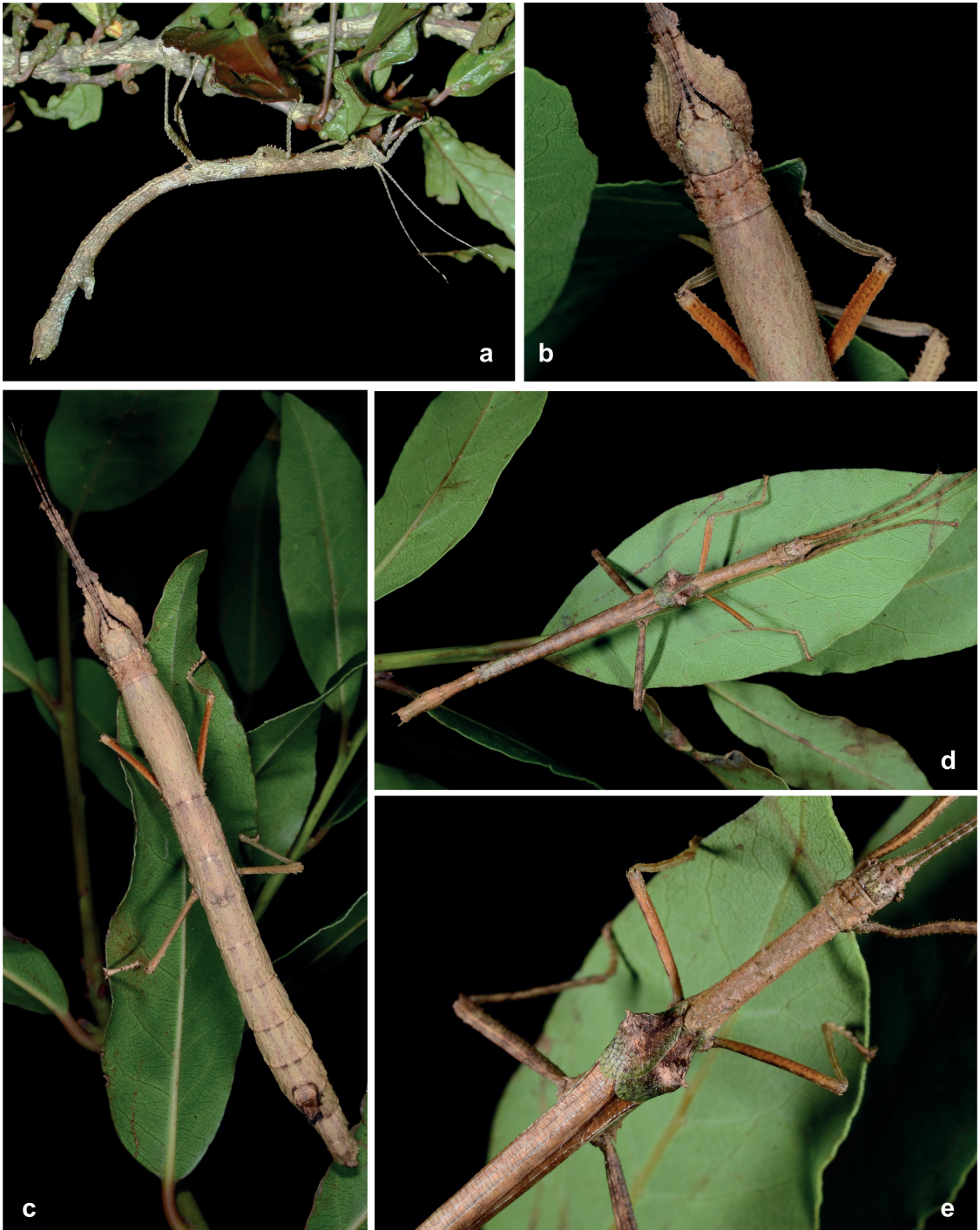


Figure 8. *Sigaruphasma* spp. live insects. a, *S. armatum* sp. nov., adult ♀ PT at locality RD-072; b, *S. bouldouii* sp. nov., head and thorax of ♀ PT showing broadened profemora and orange anterior surfaces of mesofemora; c, *S. bouldouii* sp. nov., ♀ PT; d, *S. bouldouii* sp. nov., ♂ PT; e, *S. bouldouii* sp. nov., head and thorax of ♂ PT showing the conical tegmina.

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