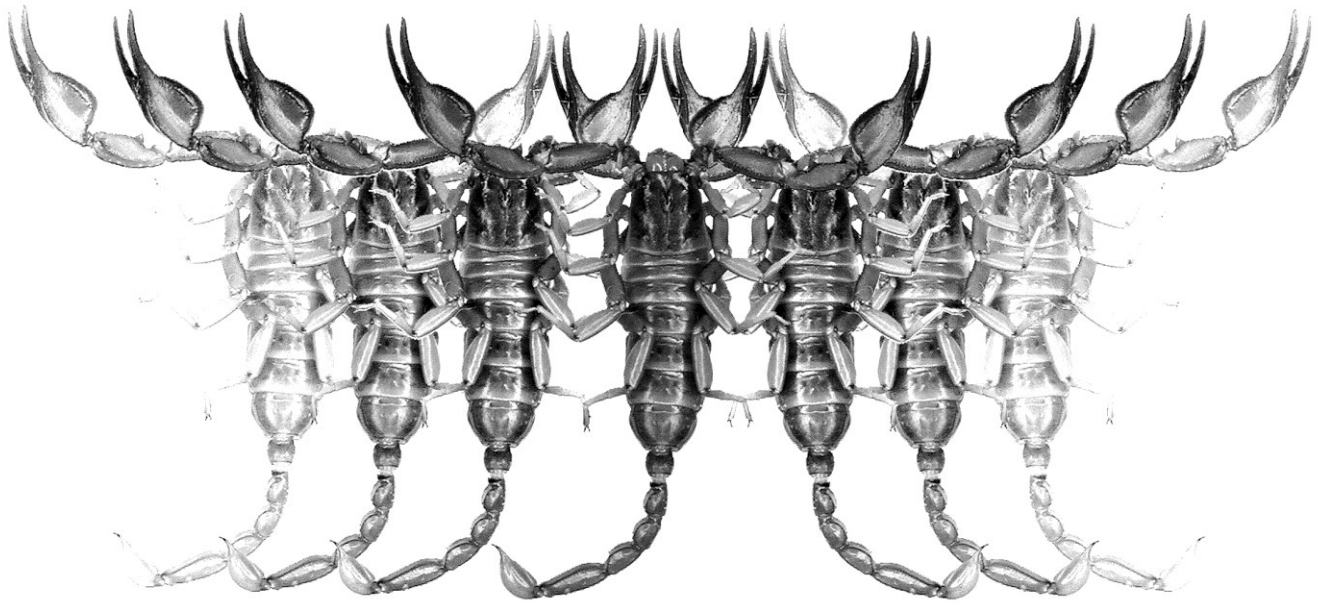


# ***Euscorpius***

**Occasional Publications in Scorpiology**



**First Record of the Genus *Microtityus* Kjellesvig-Waering,  
1966, from Puerto Rico, with Description of Two  
New Species (Scorpiones: Buthidae)**

**Rolando Teruel, Mel J. Rivera & Alejandro J. Sánchez**

**February 2014 — No. 180**

# *Euscorpius*

## Occasional Publications in Scorpiology

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Publication date: 13 February 2014

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# First record of the genus *Microtityus* Kjellesvig-Waering, 1966, from Puerto Rico, with description of two new species (Scorpiones: Buthidae)

Rolando Teruel <sup>1</sup>, Mel J. Rivera <sup>2</sup> & Alejandro J. Sánchez <sup>3</sup>

<sup>1</sup> Centro Oriental de Ecosistemas y Biodiversidad (BIOECO), Museo de Historia Natural "Tomás Romay". José A. Saco # 601, esquina a Barnada, Santiago de Cuba 90100, Cuba. rteruel@bioeco.ciges.inf.cu

<sup>2</sup> Urbanización Cumbres de Miradero # 404, Mayagüez 00682, Puerto Rico.

<sup>3</sup> Condominio Los Olmos, Apto. 3-G, # 36, Calle Nevárez, San Juan 00927, Puerto Rico.

<http://zoobank.org/urn:lsid:zoobank.org:pub:BE227D9C-6BC8-42AA-B75F-8A67F8E0DC12>

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## Summary

In the present note, we report for the first time the genus *Microtityus* Kjellesvig-Waering, 1966, from Puerto Rico, on the basis of two new species belonging to the subgenus *Parvabsonus* Armas, 1974. One of them occurs in the southwest of the main island and is morphologically most similar to *Microtityus virginiae* Armas, 1999, from Hispaniola, while the other occurs in a small satellite islet offshore the northeast coast and somewhat resembles *Microtityus waeringi* Francke & Sissom, 1980, from the Virgin Islands.

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## Introduction

The genus *Microtityus* Kjellesvig-Waering, 1966, is widely distributed and diverse in the Greater Antilles, but it is represented here only by members of the subgenus *Parvabsonus* Armas, 1974. The most recent taxonomic contributions dealing with its representatives in this region listed 20 valid species from the Dominican Republic (11) and Cuba (9), but several undescribed ones are known from both countries (Teruel & Kovařík, 2012; Armas & Teruel, 2012). Outside these two major islands, the subgenus is known so far only from a single species recorded from the Virgin Islands (Francke & Sissom, 1980).

Its apparent absence from Puerto Rico has always called the attention of specialists, especially because the species known from the Virgin Islands is widely distributed across this small archipelago, and it belongs geographically to the same platform known as the Puerto Rican Insular Bank. Repeated and intensive scorpologic searches conducted in Puerto Rico during the last 30 years never disclosed the presence of any representatives of this genus (Santiago-Blay, 2009; R. Teruel & A. Sánchez, unpublished data), which added even more suspense to this controversy.

While Dr. Carlos J. Santos of the Universidad de Puerto Rico at Mayagüez was re-examining the leaf litter sample he collected from Culebrita Island, he suddenly found a tiny scorpion, which he brought to the

attention of one of us (MJR). Its subsequent detailed study demonstrated that it represented the first member of the genus *Microtityus* ever found inside the Puerto Rican territory. But this locality is a satellite islet mid-way between Puerto Rico and the Virgin Islands, and thus, the genus still remained unrecorded from the main island. Nevertheless, this finding raised new hopes for such long-awaited discovery to become real.

About a week later, during a routine collecting trip conducted by MJR to the Susúa State Forest, another small scorpion with the same general appearance was found inside a rotten log in the ground and the controversy was finally over: the genus *Microtityus* was now confirmed to occur in the main island of Puerto Rico as expected. Further study of the two available specimens demonstrated that they represent undescribed species of the subgenus *Parvabsonus*, which are herein described and compared to the other members of the genus.

## Methods & Materials

The specimens were studied, measured and photographed under a stereomicroscope, equipped with a Visionary Digital® image stacking device and a Canon 7D digital camera. The high-resolution digital images obtained were then slightly processed with Adobe Photoshop®CS5, only to remove background and to optimize brightness and contrast for print.



**Figure 1:** Female holotype of *Microtityus* (*Parvabsonus*) *borincanus*, **sp. n.**, entire dorsal and ventral views.

Nomenclature and measurements follow Stahnke (1970), except for trichobothriotaxy (Vachon, 1974), metasomal carinae (Francke, 1977), pedipalp chela carinae (Acosta *et al.*, 2008, as interpreted by Armas *et al.*, 2011), and sternum (Soleglad & Fet, 2003). Unless otherwise noted, all morphologically diagnostic characters mentioned in the text refer to adults of both sexes.

Specimens studied herein are preserved in ethanol 80% and will be permanently deposited in the following collections: Universidad de Puerto Rico, Recinto Mayagüez, Puerto Rico (UPRM), and first author's personal collection (RTO).

## Systematics

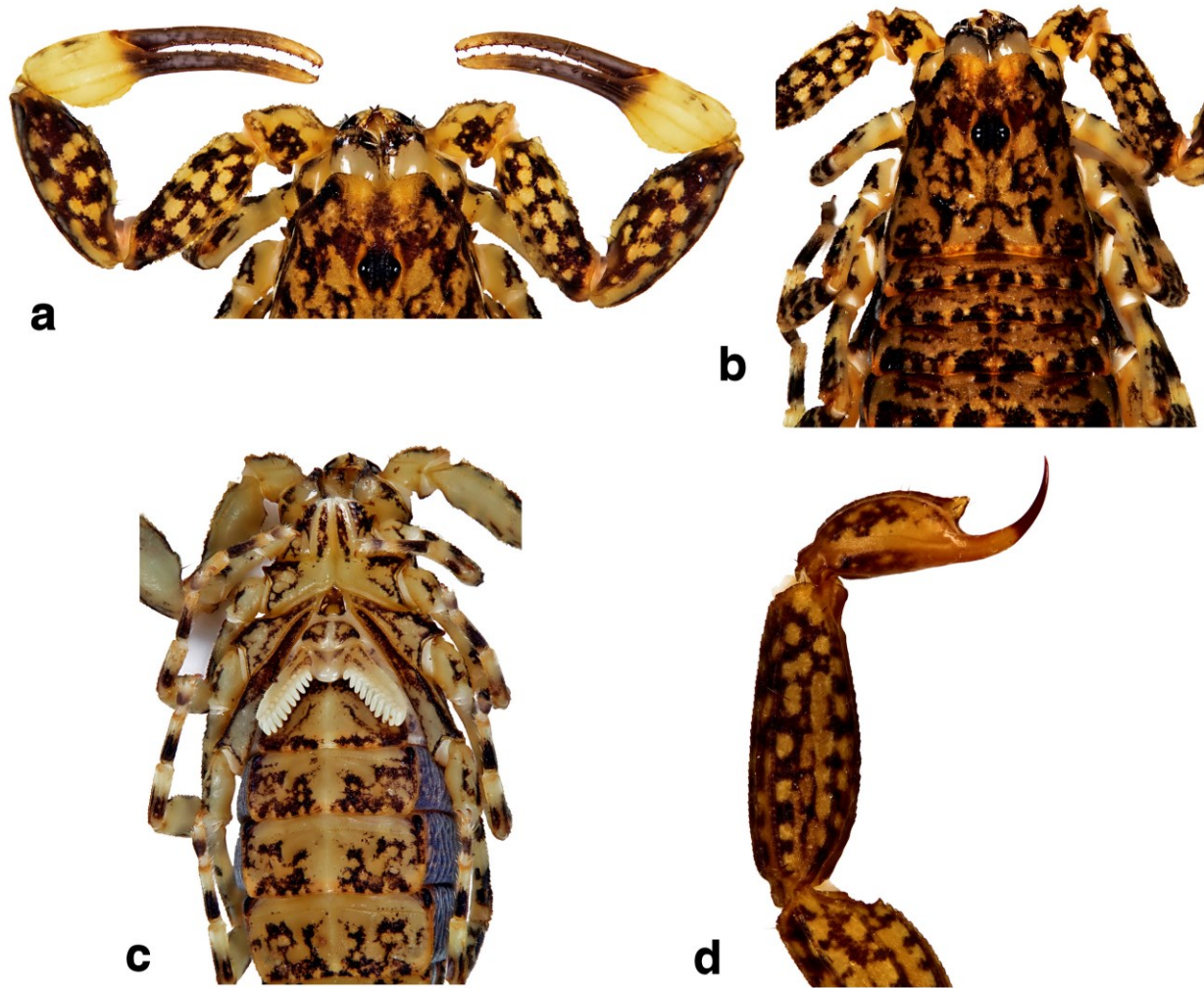
### *Microtityus* (*Parvabsonus*) *borincanus* Teruel, Rivera et Sánchez, **sp. n.**

Figures 1–3, 6–7

<http://zoobank.org/urn:lsid:zoobank.org:act:19B3B413-132C-4D7C-AA43-0B6392175B6D>

TYPE DATA. ♀ holotype (to be deposited in RTO): Puerto Rico, Sabana Grande Municipality, Barrio Susúa, Susúa State Forest, 18°05'34"N 66°54'32"W, 22 November 2013, leg. M. J. Rivera.

DIAGNOSIS. Adult size medium (17 mm) for the genus. Coloration yellowish brown, with a very dense pattern of blackish spots all over the body and appendages, metasomal segment V and telson slightly more reddish, tergites without clearly defined longitudinal dark bands, pedipalp fingers blackish with yellowish tips. Pedipalps orthobothriotaxic (femoral trichobothrium  $d_2$  present), fixed and movable fingers with 10 principal rows of denticles, basal lobe/notch combination absent. Sternite V with the smooth patch small and teardrop-shaped. Metasoma moderately slender, with 10-10-8-8-5 complete carinae, most of which are finely serrate, segments II–IV dorsolateral carinae with terminal denticle enlarged, all intercarinal spaces coriaceous to finely granulose. Telson oval, vesicle coriaceous, subaculear tubercle moderate and irregular, aculeus shorter than



**Figure 2:** Female holotype of *Microtityus* (*Parvabsonus*) *borincanus*, sp. n.: **a)** pedipalps; **b)** carapace and anterior tergites; **c)** sternopectinal region and anterior sternites; **d)** metasomal segment V and telson, lateral view.

vesicle. Pectines with 10/10 teeth, basal plate conspicuously longer than wide and spatulate.

**ETYMOLOGY.** The selected name is a Latinized adjective taken from one of the two Spanish words used to name the people native to the island of Puerto Rico, whose ancient Taino name was "Borikén", and which modern variant is "Borinquen". It highlights the occurrence of this species here, a long awaited discovery among scorpionologists but so far unaccomplished.

**DISTRIBUTION** (Fig. 6). Known only from the type locality, in southwestern Puerto Rico. It represents one of the few serpentine outcrops of the island, characterized by high levels of plant endemism (Cedeño-Maldonado & Breckon, 1996).

**DESCRIPTION** (female holotype). **Coloration** (Figs. 1, 3) base yellowish brown, very densely spotted with blackish brown all over the body and appendages, including the ventral region. Chelicerae pale yellowish, with distal margin of manus and basal half of fingers deeply infuscate. Pedipalp femur very densely spotted with blackish brown on all surfaces except ventral, which it is essentially immaculate; patella very densely spotted with blackish brown on all surfaces except ventral, which possesses spots only in the distal portion; chela with hand essentially immaculate, only a few vestigial spots are present on external surface, fingers blackish with yellowish tips. Carapace symmetrically and densely spotted with blackish brown, but with frontal lobes almost immaculate; tergites densely spotted with blackish brown, but without clearly defined pattern of longitudinal bands; venter very densely spotted with





**Figure 3:** Female holotype of *Microtityus (Parvabsonus) borincanus*, **sp. n.**, coloration in life.

blackish brown all over leg coxae, sternum, genital operculum, pectines and sternites, but with a thin yellowish strip along midline of sternites III–VI. Legs with trochanter, femur and patella very densely spotted with blackish brown externally, sparsely spotted both dorsally and ventrally, but immaculate internally, tarsi each conspicuously annulated: basal half blackish brown, distal half pale yellowish. Metasoma densely spotted with blackish brown on all surfaces, spotted pattern becoming somewhat denser and darker distally in each segment; segments IV–V and telson slightly more reddish than I–III; telson vesicle densely spotted with blackish brown, fainter on distal half; aculeus immaculate, with the distal half blackish brown. **Carapace** (Fig. 2b) slightly wider than long, subtriangular. Anterior margin deeply bilobed. Carinae: anterior median, lateral ocular, central median and posterior median granulose, superciliary

subgranulose, other carinae obsolete to absent. Tegument coriaceous to finely granulose, with coarser granules scattered. Median eyes separated by more than one ocular diameter; three pairs of lateral eyes, which are all much smaller than median eyes. **Tergites** (Fig. 2a) with the same granular sculpture as on carapace; I–VI with three longitudinal carinae, which are granulose and sharply projected beyond the posterior margin of every tergite, VII with five serrate longitudinal carinae. **Chelicerae** (Fig. 2a) with dentition typical for the genus, tegument smooth and shiny. **Pedipalps** (Fig. 2a) orthobothriotaxic A- $\alpha$  (femur with  $d_2$ ). Femur with five serrate carinae, intercarinal tegument coriaceous to finely granulose, with coarser granules scattered, internal surface with the four *i* trichobothria surrounding a spur of moderate size (smaller in left pedipalp). Patella with seven serrate carinae, intercarinal tegument with

the same granular sculpture as on femur, internal surface with 2–3 slightly larger granules. Chela oval and narrower than patella; hand with nine finely serrate carinae, intercarinal tegument coriaceous to finely granulose; fingers without basal lobe/notch combination, fixed finger with 10/10 principal rows of denticles, movable finger with 10/10 plus apical subrow composed by four granules aligned similar to principal rows (missing in right finger). **Legs** with all carinae serrate to granulose; intercarinal tegument coriaceous to finely granulose, with coarser granules scattered. **Sternum** (Fig. 2c) type 1, subtriangular. **Pectines** (Fig. 2c) about half the length of leg IV coxa. Tooth count 10/10, fulcrum very well developed. Basal middle lamella slightly enlarged, oval. Basal plate longer than wide, not spatulate, with posterior margin narrowly convex. **Sternites** (Fig. 2c) with short-oval spiracles. Sternite III with the lateral areas shallowly depressed and essentially smooth; IV–VI coriaceous to finely granulose, with coarser granules scattered; VII finely and densely granulose. Posterior margin of V essentially straight, with the smooth patch small, teardrop-shaped, slightly longer than wide, translucent, and not bulky nor protruding from posterior margin of sternite; VI–VII with two pairs of granulose lateral carinae. **Metasoma** (Figs. 1, 2d) with intercarinal tegument coriaceous to very finely and densely granulose, with coarser granules scattered; segments I–II with ten complete carinae, II–IV with eight, V with five, all sharply serrate, dorsolateral carinae on I–IV with terminal denticle conspicuously enlarged and very sharp. Telson vesicle oval, smooth and shiny, with a weakly subgranulose ventromedian carina that abruptly rises into the subaculear tubercle, which points towards the tip of the aculeus or slightly beyond, and is moderately-sized, irregularly conical, essentially smooth, and possesses two vestigial dorsal granules; aculeus shorter than vesicle, very sharp, and evenly curved.

**COMPARISONS** (adult female only). This species closely resembles *Microtityus virginiae* Armas, 1999 (from Sierra de Neiba in southern Hispaniola) as both share a unique combination of characters that unequivocally distinguish them both from the remaining members of the subgenus *Parvabsonus*: medium size, overall coloration very dark, metasoma slender, subaculear tubercle ventrally not serrate, and low pectinal tooth counts. But the latter can be easily distinguished from *M. borincanus* sp. n. by: **1)** pedipalp chela with hand very densely spotted and fingers not uniformly blackish, but also irregularly spotted; **2)** pedipalp fingers with nine principal rows of denticles; **3)** dorsolateral carinae on metasomal segments I–IV with terminal denticle only vestigially enlarged; **4)** telson conspicuously more slender, with subaculear tubercle longer and sharper.

**ECOLOGICAL NOTES.** The holotype and single known specimen was found inside a rotten log lying on the ground. Other scorpions that occur at Susúa State Forest are the scorpionid *Heteronebo portoricensis* Francke, 1978, and the buthids *Centruroides griseus* (Koch, 1845), *Tityus angelesae* Santiago-Blay, 2009, and *Tityus obtusus* (Karsch, 1879); of them, *H. portoricensis* and *T. angelesae* are soil-dwelling species, while the other two are more habitat-generalist and also occur on the vegetation.

***Microtityus (Parvabsonus) santosi* Teruel,  
Rivera et Sánchez, sp. n.**

Figures 4–6

<http://zoobank.org/urn:lsid:zoobank.org:act:5568BA44-C675-4918-8CF4-4C89B601740C>

**TYPE DATA.** ♀ holotype (UPRM): Puerto Rico, Culebra Municipality, Barrio Fraile, Culebrita Island, 18°05' 34"N - 66°54'32"W, August 31, 2013, leg. C. J. Santos.

**DIAGNOSIS.** Adult size small (13 mm) for the genus. Coloration light yellow, with a moderately dense pattern of dark brown spots all over the body and appendages; metasomal segment V and telson slightly paler and less spotted; tergites with three poorly defined longitudinal dark bands; pedipalp fingers dark brown with yellowish tips. Pedipalps orthobothriotaxic (femoral trichobothrium *d*<sub>2</sub> present), fixed and movable fingers with nine principal rows of denticles, basal lobe/notch combination absent. Sternite V with the smooth patch small and rhomboid. Metasoma moderately robust, with 10-10-8-8-5 complete carinae, most of which are finely serrate, segments II–IV dorsolateral carinae with terminal denticle enlarged, all intercarinal spaces coriaceous to finely granulose. Telson oval, vesicle coriaceous, subaculear tubercle moderate and conical, aculeus about as long as vesicle. Pectines with 9/9 teeth, basal plate slightly wider than long and not spatulate.

**ETYMOLOGY.** We are pleased to name this species after Dr. Carlos José Santos Flores (Universidad de Puerto Rico, Recinto Mayagüez), who collected the holotype and kindly made it available for study to us.

**DISTRIBUTION** (Fig. 6). Known only from the type locality, a tiny islet offshore Culebra Island in north-eastern Puerto Rico.

**DESCRIPTION** (female holotype). **Coloration** (Fig. 4) base light yellow, densely spotted with dark brown all over the body and appendages, remarkably less on the ventral region. Chelicerae pale yellowish, with distal margin of manus and basal half of fingers deeply infuscate. Pedipalp femur very densely spotted with dark brown on all surfaces except ventral, which it is im-

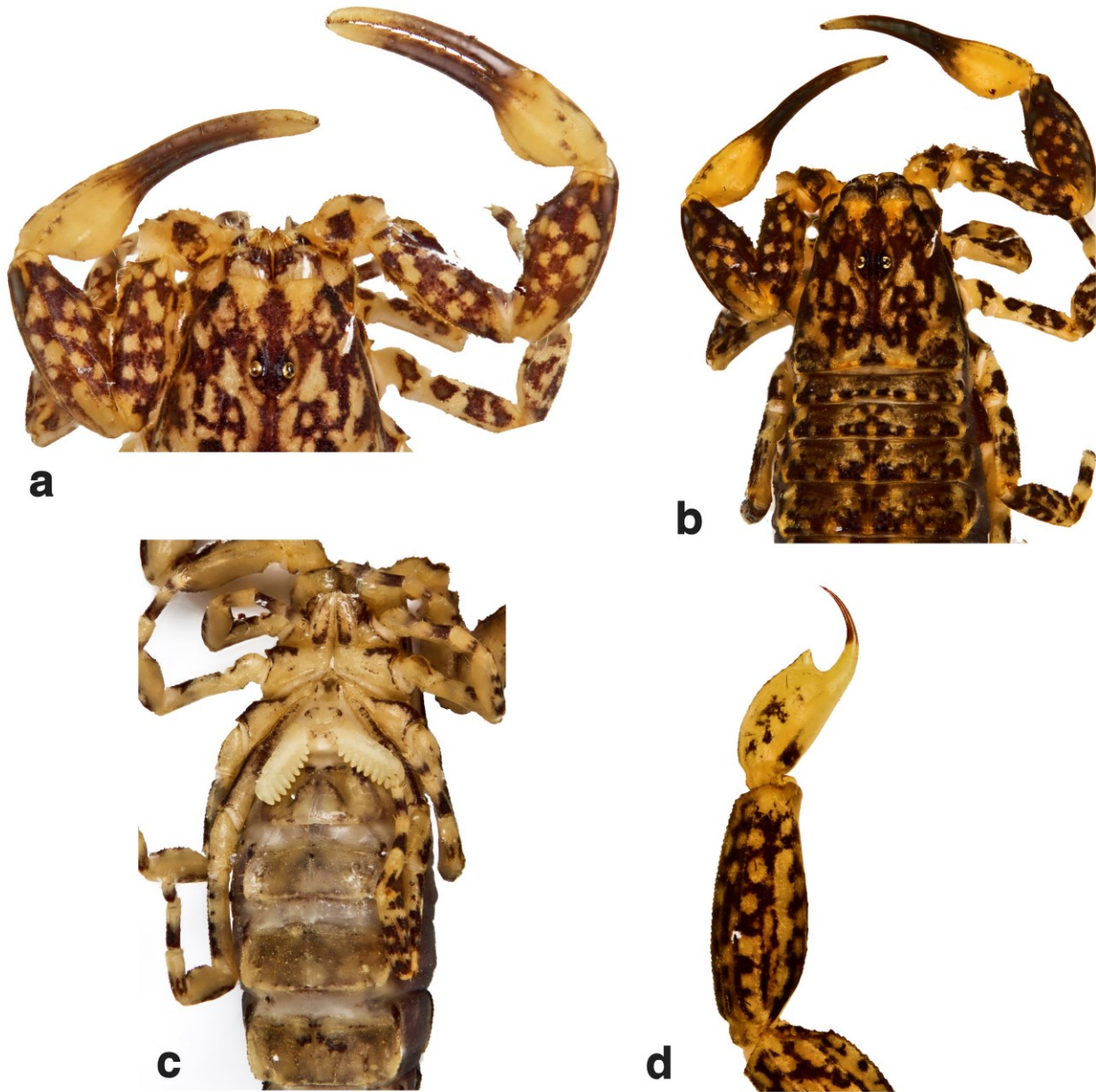


**Figure 4:** Female holotype of *Microtityus* (*Parvabsonus*) *santosi*, **sp. n.**, entire dorsal and ventral views.

maculate; patella very densely spotted with blackish brown on all surfaces except ventral, which possesses spots only in the distal portion; chela with hand almost immaculate, only a few small to moderate dark spots are present on external surface, fingers dark brown with yellowish tips. Carapace symmetrically and densely spotted with dark brown, but with frontal lobes almost immaculate; tergites densely spotted with dark brown, with three poorly defined longitudinal dark bands; venter sparsely to moderately spotted with dark brown all over leg coxae, sternum, genital operculum, and sternites III–VI, VII very densely spotted except on lateral margins; pectines immaculate yellowish, basal plate with small spots. Legs with trochanter, femur and patella very densely spotted with blackish brown externally, sparsely spotted both dorsally and ventrally, but immaculate internally, tarsi each conspicuously annulated: basal half blackish brown, distal half pale yellowish. Metasoma

densely reticulated with dark brown on all surfaces, spotted pattern not becoming denser or darker distally in each segment; telson conspicuously paler; telson vesicle sparsely spotted with brown, essentially immaculate on distal half; aculeus immaculate, with the distal half dark brown. **Carapace** (Fig. 5b) slightly wider than long, subtriangular. Anterior margin deeply bilobed. Carinae: anterior median, lateral ocular, central median and posterior median granulose, superciliary subgranulose, other carinae obsolete to absent. Tegument coriaceous to finely granulose, with coarser granules scattered. Median eyes separated by more than one ocular diameter; three pairs of lateral eyes, which are all much smaller than median eyes. **Tergites** (Fig. 5a) with the same granular sculpture as on carapace; I–VI with three longitudinal carinae, which are granulose and weakly projected beyond the posterior margin of every tergite, VII with five serrate longitudinal carinae. **Chelicerae**

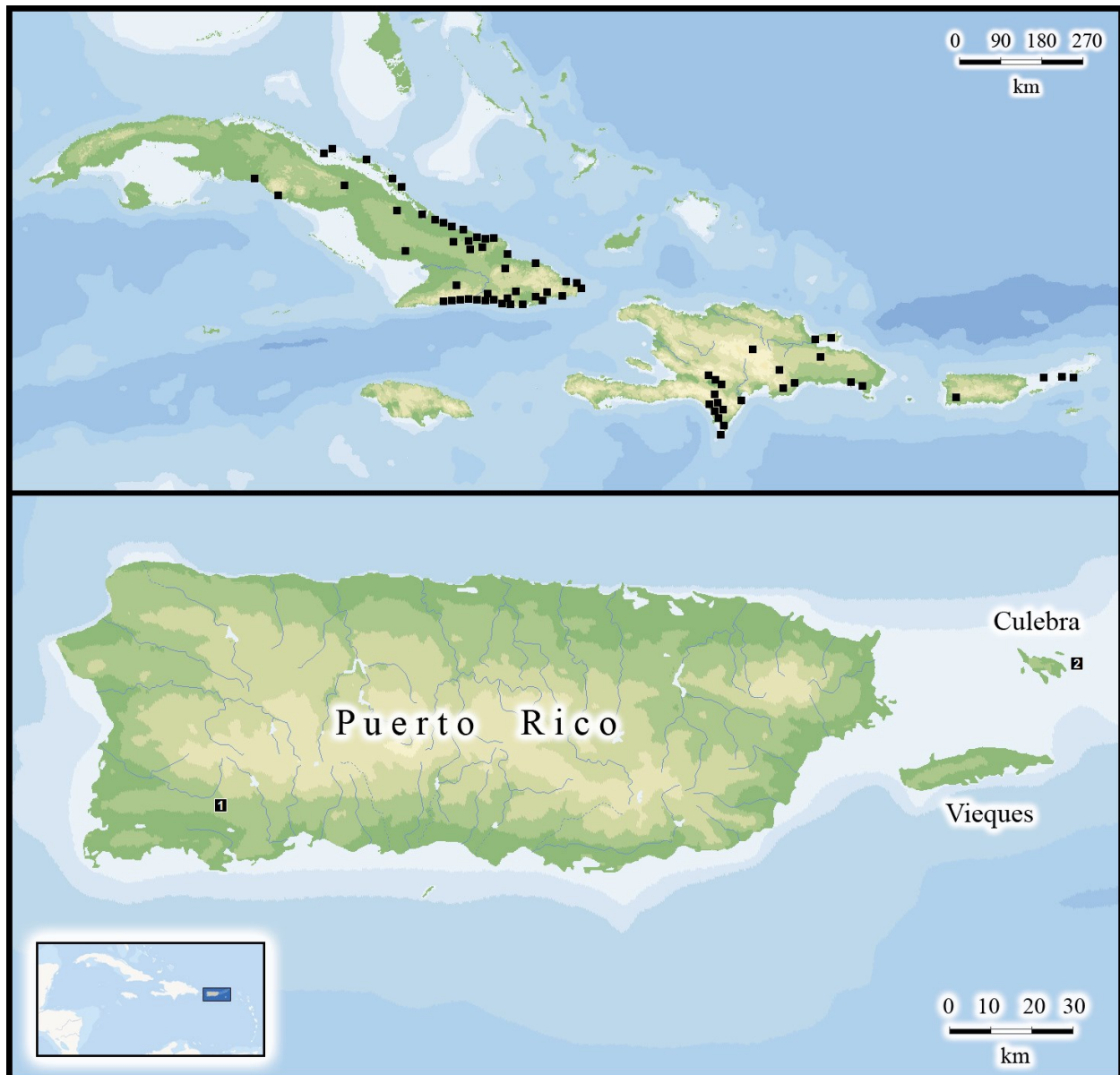




**Figure 5:** Female holotype of *Microtityus (Parvabsonus) santosi*, sp. n.: **a)** pedipalps; **b)** carapace and anterior tergites; **c)** sternopectinal region and anterior sternites; **d)** metasomal segment V and telson, lateral view.

(Fig. 5a) with dentition typical for the genus, tegument smooth and shiny. **Pedipalps** (Fig. 2a) orthobothriotaxic A- $\alpha$  (femur with  $d_2$ ). Femur with five serrate to crenulate carinae, intercarinal tegument coriaceous to finely granulose, with coarser granules scattered, internal surface with the four *i* trichobothria surrounding a spur of moderate size. Patella with seven serrate to granulose carinae, intercarinal tegument with the same granular sculpture as on femur, internal surface with one conspicuously larger granule. Chela oval and narrower than patella; hand with nine finely granulose to costate car-

inae, intercarinal tegument coriaceous to finely granulose; fingers without basal lobe/notch combination, fixed finger with 9/9 principal rows of denticles, movable finger with 10/10 and no apical subrow. **Legs** with all carinae serrate to granulose; intercarinal tegument coriaceous to finely granulose, with coarser granules scattered. **Sternum** (Fig. 5c) type 1, pentagonal. **Pectines** (Fig. 5c) about half the length of leg IV coxa. Tooth count 9/9, fulcra well developed. Basal middle lamella slightly enlarged, oval. Basal plate wider than long, not spatulate, with posterior margin widely



**Figure 6:** Distribution of the genus *Microtityus* in the Greater Antilles (above), and the Puerto Rican *Microtityus* (*Parvabsonus*) *borincanus*, **sp. n.** (1) and *Microtityus* (*Parvabsonus*) *santosi*, **sp. n.** (2).

convex. **Sternites** (Fig. 5c) with short-oval spiracles. Sternite III with the lateral areas shallowly depressed and essentially smooth; IV–VI coriaceous to finely granulose, with coarser granules scattered; VII finely and densely granulose. Posterior margin of V essentially straight, with the smooth patch small, cordiform, slightly longer than wide, translucent, and not bulky nor protruding from posterior margin of sternite; VI–VII with two pairs of granulose lateral carinae. **Metasoma** (Figs. 4, 5d) with intercarinal tegument coriaceous to very finely and densely granulose, with coarser granules scattered; segments I–II with ten complete carinae, II–IV with eight, V with five, all sharply serrate, dorsolateral

carinae on I–IV with terminal denticle conspicuously enlarged and very sharp. Telson vesicle oval, smooth and coriaceous, with a weakly subgranulose ventro-median carina that obtusely rises into the subaculear tubercle, which points towards the distal third of the aculeus and is moderately-sized, regularly conical, smooth, and lacks any dorsal granules; aculeus about as long as vesicle, very sharp, and evenly curved.

**COMPARISONS** (adult female only). This species possesses an autapomorphy that unambiguously distinguishes it from all other members of the subgenus *Parvabsonus*: the basal pectinal plate wider than long





**Figure 7:** Two views of Susúa State Forest, habitat of *Microtityus* (*Parvabsonus*) *borincanus*.



(actually very short), not spatulate, and with the posterior margin widely convex. The shape of this plate varies among the different species, but it is always longer than wide, spatulate, and with the posterior margin narrowly convex, straight, or concave.

Apart from this, at first sight it resembles *Microtityus waeringi* Francke & Sissom, 1980 (from the neighboring Virgin Islands) by its small size, overall coloration dark but not blackish, metasoma not particularly slender, and subaculear tubercle moderate and ventrally not serrate. But the latter can be easily distinguished from *M. santosi* **sp. n.** by: **1)** pedipalp femur less densely spotted, and metasoma distally darker; **2)** sternite V without smooth patch.

**ECOLOGICAL NOTES.** According to the collector (C. J. Santos Flores, personal communication), the holotype and single known specimen was found while sorting dry leaf litter taken directly from the ground, at an approximate altitude of 15 m a.s.l. The only other scorpion so far known from Culebrita Island is *C. griseus*, which occurs both in the soil and the vegetation.

## General Comments

The present additions raise the number of *Microtityus* species known from the Greater Antilles to 22, all of them belonging to the subgenus *Parvabsonus* as recently redefined by Armas & Teruel (2012). Nevertheless, at least 10 undescribed additional taxa are already identified and being described from Cuba and Hispaniola (R. Teruel & L. F. de Armas, in preparation).

With the discovery of the two new species in both geographical extremes of Puerto Rico (*M. borincanus* **sp. n.** in the southwest of the main island and *M. santosi* **sp. n.** in a satellite islet in the northeast), the possibility that the genus may be more widespread and diverse in this archipelago becomes quite real. The species of *Microtityus* typically have small and/or patchy distributions, which are strictly associated to particular landscape, vegetation or soil type, and allopatric speciation seems to have occurred intensively in every territory where the genus is present, thus, there is no reason to assume Puerto Rico may be an exception to this clear pattern.

The three *Microtityus* species now known to occur at the Puerto Rican Insular Bank can be reliably distinguished from each other using the following key (based on females only, as no males are known from two of them):

- 1- Pectines with the basal plate very short, wider than long, not spatulate, and with posterior margin widely convex. Distribution: Culebrita Island -----  
----- *M. santosi* **sp. n.**

- Pectines with the basal plate longer than wide, spatulate, and with posterior margin narrowly convex or concave. Distribution: Puerto Rico or Virgin Islands ----- 2

- 2- Coloration very dark and densely spotted with blackish brown. Pedipalp fingers with ten principal rows of denticles. Basal pectinal plate with posterior margin narrowly convex. Sternite V with a small smooth patch. Distribution: southwestern Puerto Rico ----- *M. borincanus* **sp. n.**

- Coloration lighter and moderately spotted with medium to dark brown. Pedipalp fingers with nine principal rows of denticles. Basal pectinal plate with posterior margin concave. Sternite V without smooth patch. Distribution: Virgin Islands ----- *M. waeringi*

## Acknowledgments

First, we are greatly indebted to Dr. Carlos José Santos Flores (Universidad de Puerto Rico, Recinto Mayagüez) for kindly making available to us the *Microtityus* specimen collected by himself at Culebrita Island, during a field trip where he was timely assisted by Jeanine Vélez and Steven Flores Llanos. As a part of the deskwork conducted by one of us (MJR) at the above-mentioned university, the crucial assistance was given by Mr. José Almodóvar during the microscopic photographic stage. We also thank Luis F. de Armas (Instituto de Ecología y Sistemática, Havana, Cuba), Jan O. Rein (Trondheim, Norway), and Fernando J. M. Rojas-Runjaic (Museo de Historia Natural La Salle, Caracas, Venezuela) for the literature kindly provided. Further, we thank two anonymous reviewers for their comments to the manuscript.

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