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First record of the genus *Charinus* Simon, 1892 from Martinique, Lesser Antilles, with description of a new species (Amblypygi: Charinidae)

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Abstract

The genus *Charinus* Simon, 1892 is herein recorded for the first time from the Lesser Antillean island of Martinique (a French Overseas Territory), on the basis of two species. One of them occurs in the karstic hill of the southern part of the island and is herein described, supported by a thorough photographic complement. It is compared in detail to all its morphologically closest Antillean relatives and a brief supplementary comment is given on the high-rank taxonomy of the order.

Key words: Amblypygids, whip-spiders, taxonomy, new species, new record, America

Introduction

The genus *Charinus* Simon, 1892 is currently the sole Antillean representative of the whipspider family Charinidae Quintero, 1986. It remained known in the region only from the Greater Antilles, until Armas (2006) published a photograph of an undetermined species from a Lesser Antillean island of The Grenadines, which still remains unstudied.

Five years later, Teruel & Questel (2011) described the first authenticate Lesser Antillean species: *Charinus bruneti* Teruel & Questel, 2011, from the small island of Saint-Barthélemy. In that paper, Teruel & Questel (2011: 18) predicted that other species of the genus could be discovered as more islands of this archipelago were sampled. This prediction was soon proved correct, when Teruel & Questel (2015) described the second species: *Charinus desirade* Teruel & Questel, 2011, from this islet offshore Guadeloupe.

During recent soil invertebrate surveys in the southern karstic hills of Martinique, one more undescribed species of *Charinus* was collected. Its description is presented in this paper, together with a wide illustrative complement.

Material and Methods

The specimens were studied, measured, drawn and photographed under a Zeiss Stemi 2000-C stereomicroscope, equipped with line scale and grid ocular micrometers, and a Canon PowerShot® A620 digital camera. A variable series of consecutive-plane shots was taken depending on the field depth (i.e., the bulkiest the structure, the largest number of photographs needed), then, all images of every structure were assembled into a single fully-focused image using the free software CombineZP. All images were processed with Adobe Photoshop CS5 only slightly, i.e., optimization of bright and contrast, removal of artifacts and unnecessary details from background and assemblage of plates.

Nomenclature and measurements follow Quintero (1983), except for pedipalp segmentation after Shultz (1999: coxa, trochanter, femur, patella, tibia, tarsus and claw) and its spine numeration system after Weygoldt (2000), modified by Teruel (2016). Adulthood of specimens was unequivocally determined by the full sclerotization of pedipalps and the detection of eggs visible through the abdominal wall.

The four type-specimens are preserved in ethanol 80% and deposited in the personal collection of the first author (RTO), with labels originally written in Spanish (transcribed into English in the present text).

Systematics

Charinus martinicensis, new species

Figures 1–4. Table I

TYPE DATA. MARTINIQUE: Sainte-Anne: Morne Manioc (14°26'00"N – 60°51'26"W, 150 m a.s.l.); 27/May/2017; M. Coulis; 1♀ holotype (RTO), 1♀ paratype (RTO). Same data, except: 30/August/2016; 2♀♀ paratypes (RTO).

ETYMOLOGY. The selected specific epithet is a Latinized adjectival name derived from the toponym of the island where this species is known to occur.

DIAGNOSIS (females only). Adult size medium to moderately large (3.9–6.7 mm) for the genus. Coloration immaculate olivaceous brown, with median and lateral ocular tubercles black. Carapace with all three ocular groups and their respective tubercles fully developed; frontal area widely convex. Tritosternum/tetrasternum/pentasternum with 3–2/2–1/1 pairs of spiniform macrosetae, respectively; tritosternum with a pair of apical spiniform setae. Leg I flagellum with 23 tibial and 37 tarsal segments. Leg IV basitibia either trisegmented or bisegmented. Tarsomere II of legs II–IV with translucent membranous ring complete.

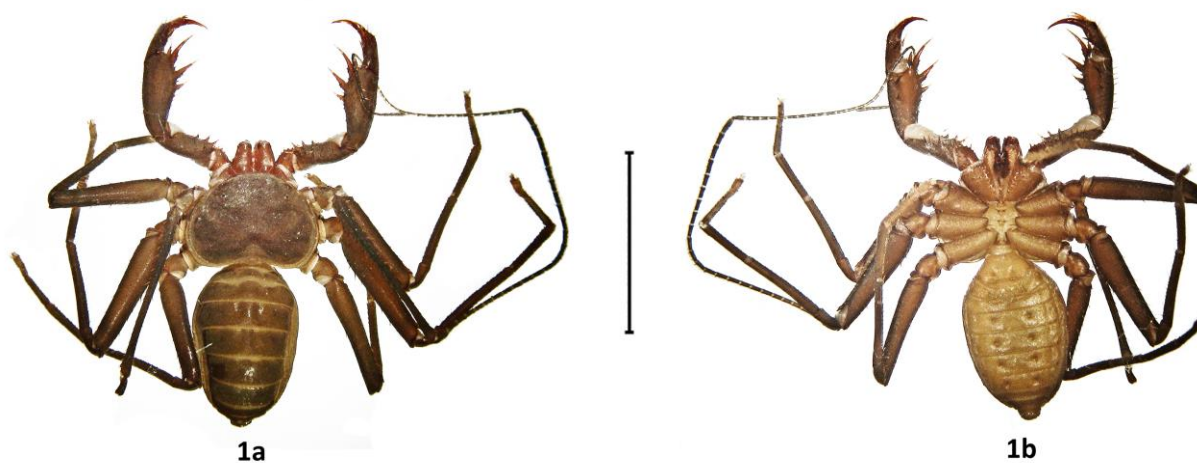


Figure 1. Adult female holotype of *Charinus martinicensis* sp. n., full-body views: a) dorsal; b) ventral. Scale bar: 5 mm.

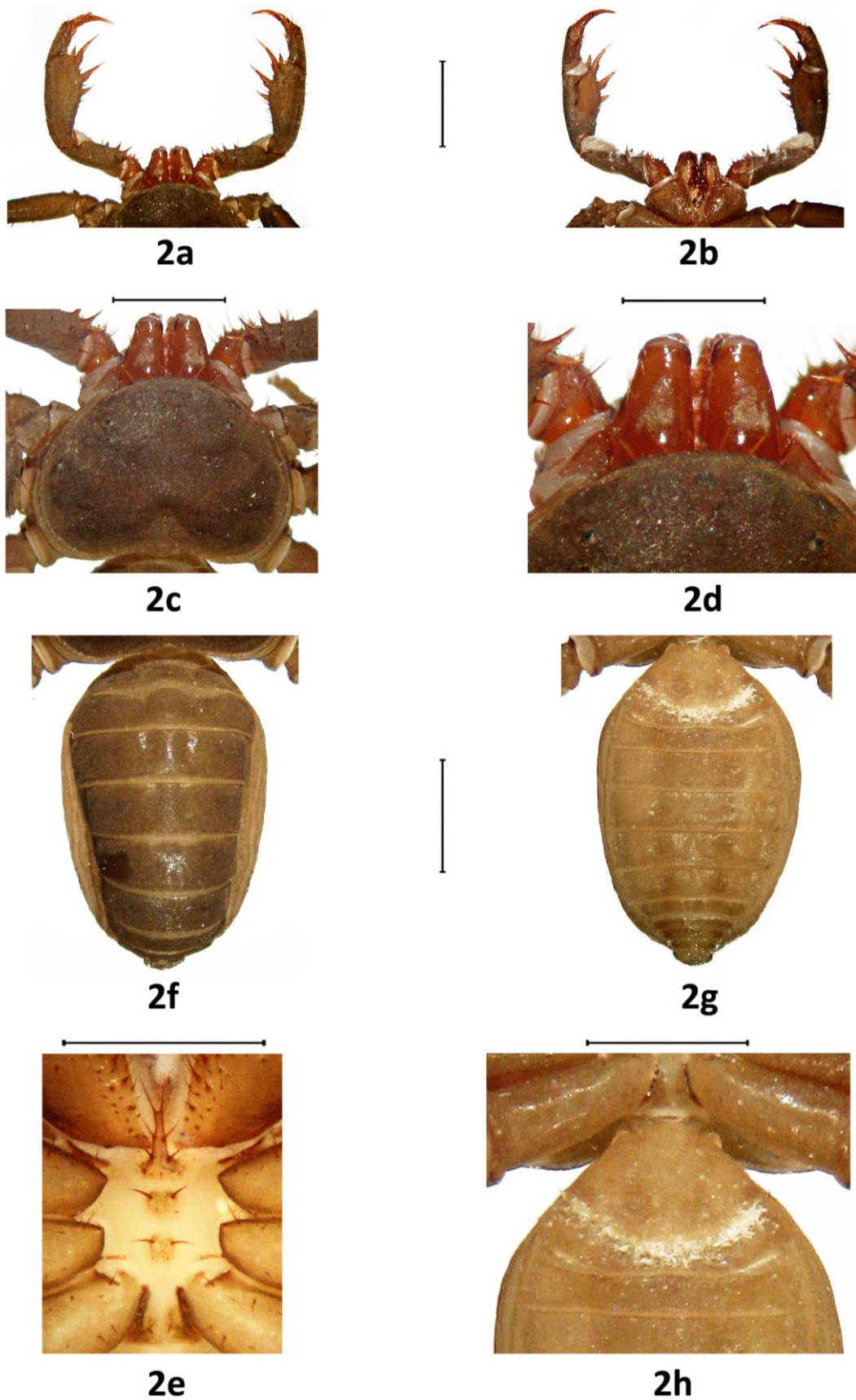


Figure 2. Adult female holotype of *Charinus martinicensis* sp. n., close-ups: **a)** chelicerae and pedipalps, dorsal; **b)** chelicerae and pedipalps, ventral; **c)** carapace, dorsal; **d)** chelicerae and frontal area of carapace, dorsal; **e)** sternal area, ventral; **f)** abdomen, dorsal; **g)** abdomen, ventral; **h)** sternites I–IV, ventral. Scale bars: 2 mm (a–b), 1.5 mm (c–d, f–g), 1 mm (e–h).

DESCRIPTION (adult female holotype). **Coloration** (fig. 1) uniformly olivaceous brown, slightly paler on venter and darker on carapace and pedipalps. Chelicerae reddish. Intersegmental membranes whitish. Carapace with median and lateral ocular tubercles blackish.

Chelicerae (figs. 2a–b) with dentition standard for the genus: ventrointernal edge of manus with four teeth, the distalmost bicuspid with apical cusp longer.

Pedipalps (figs. 2a–b) not attenuated, tegument minutely wrinkled, completely devoid of granules but with abundant spiniform setae in all segments, much stronger on trochanter and femur. Trochanter moderately covered with large spiniform setae, with one anterodorsal spine (long, sharp and sinuose); ventroapical spur large, thick and with tip very sharp and curved inwards. Femur with three dorsal spines (Fd-1 > Fd-2 > Fd-3, all subdivided by sutures), flanked externally by an oblique irregular row of 11–13 large setiferous tubercles and heavy spiniform macrosetae (stronger basally); ventrally with three spines (Fv-1 > Fv-2 > Fv-3), plus five mostly small spiniform setae. Patella moderately flat; dorsally with three very large spines (Pd-1 < Pd-2 < Pd-3, none subdivided by sutures), plus a very large spine-like setiferous tubercle distal to Pd-3 (actually a modified Pd-4, slightly shorter than Pd-1); ventrally with two spines (Pv-1 about half the length of Pv-2, none subdivided by sutures) and about 11 spiniform setae irregularly arranged into two longitudinal rows. Tibia markedly flat; dorsally with two spines (Td-1 half the size of Td-2, none subdivided by sutures); ventrally with one spine (Tv-1), which is of similar size to Fv-1 and Pd-2 and not subdivided by any suture. Tarsus dorsally with two spines (Bd-1 almost three times shorter than Bd-2, none subdivided by sutures); ventrally smooth, with cleaning organ very long, closely barbed and distally stronger. Claw long, sharp, evenly curved inwards and smooth; membranose division between tarsus and postarsus well defined, but undulate (i.e., not circular).

Carapace (fig. 2c) widely cordiform, 1.29 times wider than long. Tegument minutely wrinkled, but otherwise completely devoid of granules and with a few minute setae symmetrically scattered on medial region. Frontal margin wide and markedly convex (widely protruded), with three pairs of spiniform setae; posterior margin with eight pairs of minute spiniform setae. Median eyes well-developed, median ocular tubercle strong but located inside a deep oval depression of the tegument, underlying melanic pigment fully developed; lateral eyes well developed but unpigmented, entirely translucent-white, lateral ocular tubercles well developed, with underlying melanic pigment fully developed.

Tergites (fig. 1a). With the same sculpture and setation as on carapace.

Ventral region (figs. 1b, 2e,g–h). Tritosternum long and apically narrow (vestigially bottle-shaped), with two apical macrosetae plus two pairs of slightly smaller spiniform macrosetae (median and sub-basal), an additional basal pair smaller and thinner, and five spiniform microsetae irregularly arranged around basal part. Tetrasternum moderately sclerotized, wider than long and with a large median pair of spiniform macrosetae plus a much smaller basal pair of spiniform microsetae. Pentasternum moderately sclerotized, wider than long and with a large median pair of spiniform macrosetae plus a minute basal pair of spiniform microsetae. Metasternum weakly sclerotized, wider than long and with a pair of large spiniform setae. Sternites smooth, moderately covered by short, thin setae; genital operculum large, with posterior margin widely rounded.

Legs (figs. 1a–b) slender but not unusually attenuated, femur sparsely covered with minute scale-like tubercles and spiniform setae of various sizes. Right leg I flagellum with 23 tibial and 37 tarsal segments, first tarsomere about twice as long as second; left leg flagellum missing. Leg IV basitibia trisegmented (left) or bisegmented (right). Tarsomere II of legs II–IV with the translucent membranous ring complete, representing a true tarsal subdivision.

MALE. Unknown.

VARIATION. The three paratype females are adult, but conspicuously smaller (tab. I) and paler than holotype. Such size variation is common in amblypygids, because there is no terminal ecdysis, i.e., individuals never stop molting and growing during their entire lifetime. Concurrently, the width/length ratio of carapace varies from 1.25–1.28 amongst paratypes.

All four type-specimens have minor anomalies in pedipalp spination. The most extreme case is the largest paratype, which exhibits right Fv-2 folded from base, right Pd-2 folded distally, left Pv-2 folded from base, left Td-1 missing and left Bd-2 doubled. Moreover, the smaller paratypes have pedipalps with setation fewer and sparser.

Table I. Measurements (mm) of three type-specimens of *Charinus martinicensis* sp. n. Abbreviations: length (L), width (W).

Dimensions		♀ holotype	♀ paratype	♀ paratype
Carapace	L / A	2.56 / 3.29	1.80 / 2.30	1.60 / 2.00
Abdomen	L	4.15	2.70	2.30
Pedipalp	L	5.88	3.67	2.68
Femur	L / A	1.65 / 0.69	1.00 / 0.33	0.75 / 0.30
Patella	L / A	2.10 / 0.70	1.30 / 0.38	0.80 / 0.28
Tibia	L	1.00	0.47	0.40
Basitarsus	L	0.55	0.45	0.39
Postarsus	L	0.58	0.45	0.34
Leg I Femur	L	4.25	2.48	2.10
Leg IV Femur	L	2.93	1.90	1.50
Total	L	6.71	4.50	3.90

Two of the three paratypes have leg I flagellum with the same segmentation as holotype: 23/23 tibial and 37/37 tarsal segments. The remaining specimen has 23/21 tibial and 32/39 tarsal segments, with tarsal part of left leg and complete right leg showing clear evidence of regeneration, i.e., many segments are much shorter than normal.

Segmentation of leg IV basitibia exhibits interesting variations amongst paratypes. The female collected in 2017 has right basitibia fully trisegmented but left basitibia partially trisegmented (basalmost division only involves dorsal half). Both paratypes collected in 2016 have fully trisegmented basitibia.

The number of spiniform setae of tritosternum/tetrasternum/pentasternum is also variable. The paratype collected in 2017 has 3/1/1 pairs (plus 6/2/0 basal microsetae), while both paratypes collected in 2016 have 3/2/1 pairs (plus 5/2/1 basal microsetae) and 2/1/1 (with 2/0/0 microsetae), respectively.

The coloration described above corresponds to freshly preserved specimens. In live individuals it is moderately darker, with a satin sheen due to the presence of the same cerotegument recently described for other amblypygids (Wolff *et al.*, 2016).

COMPARISONS. The presence of fully developed median eyes and ocular tubercle makes this new species very easy to distinguish from all other Antillean described congeners, except *Charinus acosta* (Quintero, 1983), *Charinus bruneti* Teruel & Questel, 2011, and *Charinus victori* Armas, 2010, three insular endemics from Cuba, Saint-Barthélemy and Puerto Rico, respectively. But the differences in modal count of tibial/tarsal segments of leg I flagellum are clearly diagnostic: 23/37 in *C. martinicensis* sp. n., 23/41 in *C. acosta*, 22/39 in *C. bruneti*, and 21/33 in *C. victori*.

DISTRIBUTION (fig. 4). This species is known only from the type locality, in the low calcareous karstic hills (= "mornes") of southern Martinique, in the Windward Islands of the Lesser Antilles.

ECOLOGICAL NOTES. All specimens were found hanging to the underside of limestone rocks (fig. 3a), semi-buried in the deep leaf litter of the coastal semicaducifolious forest (fig. 3b).

REMARKS. One paratype collected in 2016 has right leg I flagellum detached, but it is stored in the same vial as the specimen. The other paratype from the same date has right leg II flagellum missing.

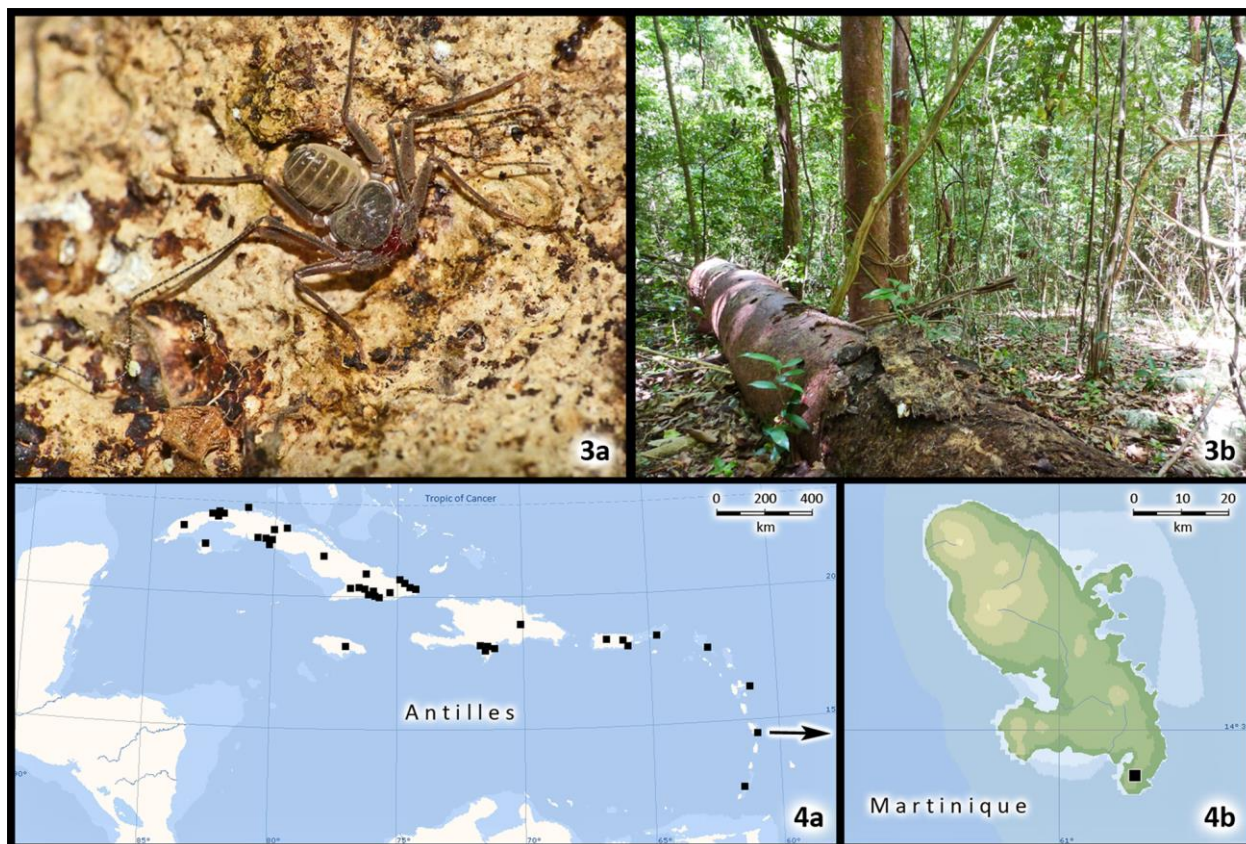
Both paratypes collected in 2016 have the median area of sternite II with an irregularly-sculptured, raised area that blocks the genital operculum from being lifted. It is most likely a teratology derived from a

disease or accident, because the operculum is completely normal in the holotype and paratype collected in 2017.

With this addition, the list of the Antillean charinid amblypygids is raised to 15 species:

1. *Charinus acosta* (Quintero, 1983): Cuba.
2. *Charinus bahoruco* Teruel, 2016: Hispaniola
3. *Charinus bruneti* Teruel & Questel, 2011: Saint-Barthélemy.
4. *Charinus caribensis* (Quintero, 1986): Jamaica.
5. *Charinus centralis* Armas & Ávila, 2001: Cuba.
6. *Charinus cubensis* (Quintero, 1983): Cuba.
7. *Charinus decu* (Quintero, 1983): Cuba.
8. *Charinus desirade* Teruel & Questel, 2015: Guadeloupe.
9. *Charinus dominicanus* Armas & Pérez, 2001: Hispaniola.
10. *Charinus martinicensis* Teruel & Coulis, 2017: Martinique.
11. *Charinus muchmorei* Armas & Teruel, 1997: Virgin Islands.
12. *Charinus perezassoi* Armas, 2010: Puerto Rico.
13. *Charinus toasmicheli* Armas, 2006: Cuba.
14. *Charinus victori* Armas, 2010: Puerto Rico.
15. *Charinus wanlessi* (Quintero, 1983): Cuba.

Nevertheless, this list is by no means complete. At least five undescribed species are already known from Cuba, Hispaniola and The Grenadines (Armas, 2006; Teruel & Questel, 2015; R. Teruel, unpublished data), and more additions are expected as other islands of the Antilles become better sampled for these tiny amblypygids. For example, when the present paper was already submitted to press, new fieldwork in another site of Martinique yielded specimens of a different, second species of *Charinus*, which is currently being studied by us (R. Teruel & M. Coulis, in preparation).



Figures 3-4. 3 Adult female paratype of *Charinus martinicensis* sp. n.: a) photographed alive upon finding; b) natural habitat. 4 Map showing with black squares: a) known geographical distribution of the genus *Charinus* in the Antilles, including unpublished records from Cuba and Hispaniola by the present author; b) type locality of *Charinus martinicensis* sp. n.

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