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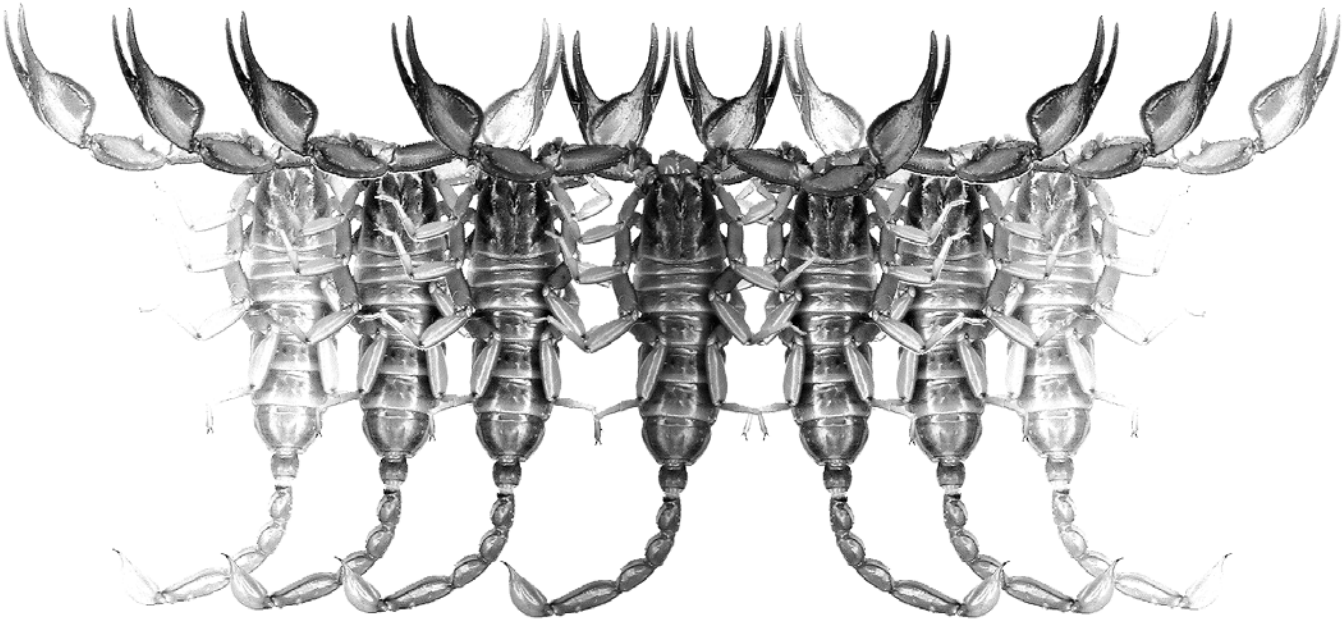

A New Species of the Genus *Oiclus* Simon, 1880 (Scorpiones: Scorpionidae: Diplocentrinae) from Guadeloupe, Lesser Antilles

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A new species of the genus *Oiclus* Simon, 1880 (Scorpiones: Scorpionidae: Diplocentrinae) from Guadeloupe, Lesser Antilles

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Summary

A new species of *Oiclus* Simon, 1880 is described from Guadeloupe in Lesser Antilles. It is closely related to *Oiclus purvesii* s. s. (Becker, 1880), and represents the first record of this genus from mainland Guadeloupe. The previous record of *O. purvesii* s. s. from Terre-de-Haut (Les Saintes, a small islet offshore Basse-Terre) is regarded as dubious, as it possibly refers to the new taxon herein described. Also, some topics on the taxonomy and distribution of this genus are briefly discussed.

Introduction

The genus *Oiclus* Simon, 1880 represents a small group of minute Diplocentrinae scorpions, which are endemic in most of the northernmost Leeward Islands in the Lesser Antilles (Francke, 1978; Armas, 1988, 2005; Sissom & Fet, 2000; Teruel & Francke, 2006; Teruel, 2008). Since its original description, the genus *Oiclus* remained monotypic for almost 130 years, with *Oiclus purvesii* (Becker, 1880) as its single species. Very recently, a second species *Oiclus questeli* was described by Teruel (2008) from Saint-Barthélemy, and this author suggested that the diversity of *Oiclus* could actually be higher than suspected.

This suspicion became quickly confirmed in mid-2009, when one of us (LC) detected a population of *Oiclus* in a single locality of Grande-Terre on mainland Guadeloupe: four specimens were collected (three adult males and one juvenile male), and a detailed study revealed them to belong to another separate and yet undescribed species. It is worth to mention here that this represents the first "true" finding of the genus *Oiclus* on mainland Guadeloupe, because the only two records previously published from this French overseas territory actually refer to the small offshore islet of Les Saintes (Francke, 1978), and the very remote and separate island of Saint-Barthélemy (Teruel & Francke, 2006; Teruel, 2008), as can be easily seen here in our Figure 5.

Methods & Material

The specimens were studied, measured and photographed under a Zeiss Stemi 2000-C stereomicroscope, equipped with line scale and grid ocular micrometers, and a Canon PowerShot A620 digital camera, all calibrated to 20x. Digital images were slightly processed with Adobe Photoshop® 8.0, only to optimize bright and contrast. Nomenclature and measurements follow Stahnke (1970), except for trichobotriotaxy (Vachon, 1974), metasomal carinae (Francke, 1977), and sternum (Soleglad & Fet, 2003). In the table, all measurements are given in millimeters as length/width/depth except for the carapace, where these correspond to length/posterior width. Abbreviations for the collections where the studied material is deposited: Museum of Comparative Zoology, Harvard University, Massachusetts, USA (MCZ), Montana State University, Montana, USA (MSU), and personal collection of the first author (RTO).

Systematics

Oiclus nanus Teruel et Chazal, sp. nov.

(Figures 1–5, Table 1)

(?) *Oieclus purvesii purvesii*: Francke, 1978: 33, 35.
(?) *Oiclus purvesii purvesii*: Teruel & Francke, 2006: 286, fig. 2; Teruel, 2008: 95, fig. 5.

Diagnosis (males only, females unknown): species of small size (20–23 mm) for the genus. Body light brown, diffusely patterned with dark brown; legs yellowish; pedipalps and metasoma with carinae and fingers faintly infuscate. Entire body conspicuously hirsute, especially on pedipalps, mesosoma and metasoma. Carapace polished, with very finely and densely granulose areas

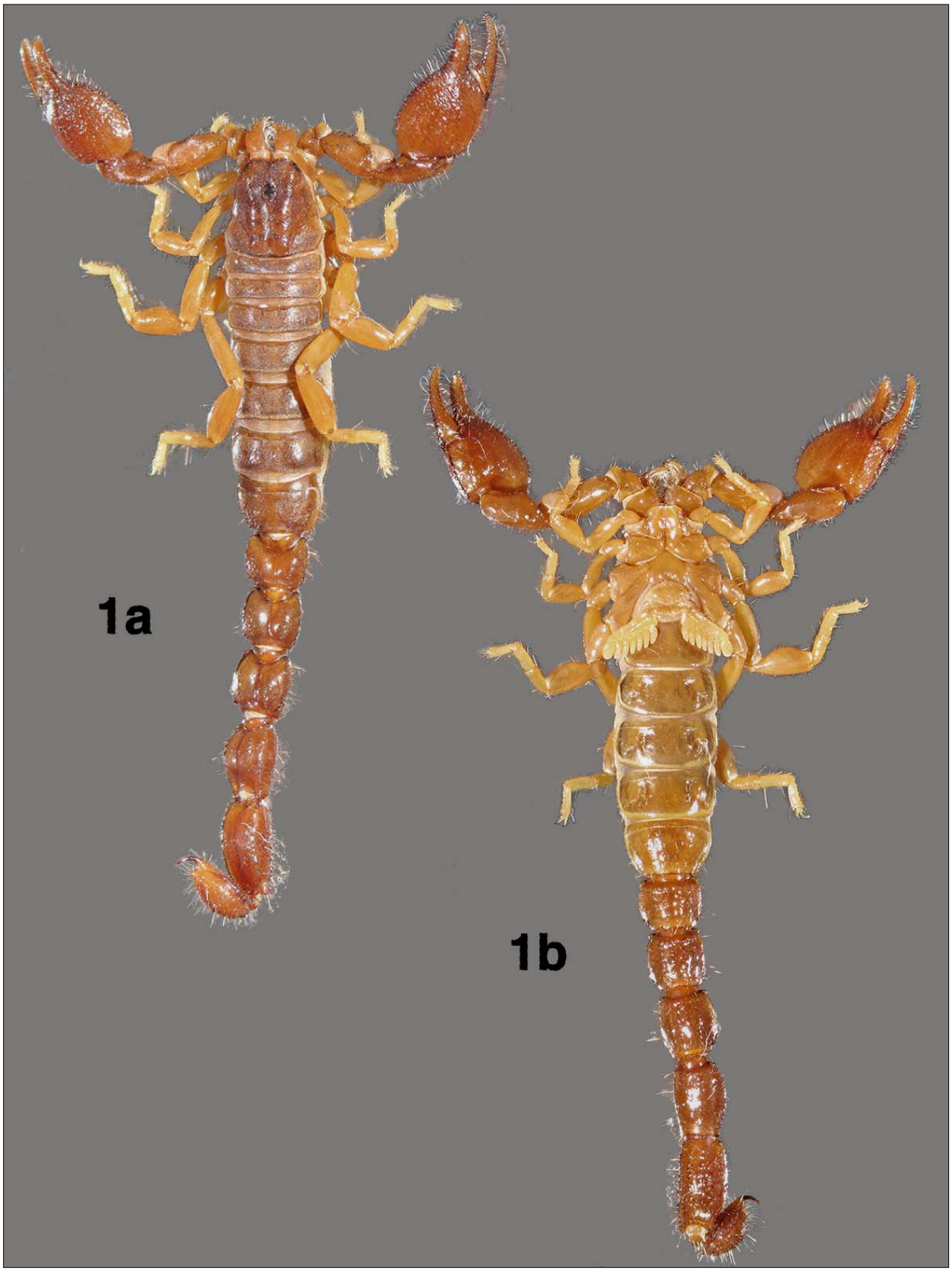

Figure 1: Adult male holotype of *Oiclus nanus* **sp. n.**: **a)** entire dorsal view; **b)** entire ventral view.

Dimensions		♂ holotype	♂ paratype
Carapace	L / Wp	2.70 / 2.70	3.20 / 3.10
Mesosoma	L	5.80	6.50
Tergite VII	L	1.20 / 2.30	1.50 / 2.80
Metasoma	L	11.60	13.50
Segment I	L / W	1.40 / 1.70	1.60 / 1.90
Segment II	L /W	1.60 / 1.55	1.80 / 1.75
Segment III	L / W	1.70 / 1.50	2.00 / 1.70
Segment IV	L / W	2.00 / 1.40	2.30 / 1.60
Segment V	L / W	2.50 / 1.35	2.90 / 1.55
Telson	L	2.40	2.90
Vesicle	L / W / H	1.70 / 1.20 / 1.00	2.10 / 1.40 / 1.10
Aculeus	L	0.70	0.80
Pedipalp	L	7.30	8.90
Femur	L / W	1.80 / 0.90	2.10 / 1.00
Patella	L / W	2.00 / 0.95	2.50 / 1.10
Chela	L	3.50	4.30
Hand	L / W / H	1.50 / 1.70 / 1.60	1.80 / 2.00 / 2.30
Movable finger	L	2.00	2.50
Total	**L**	**20.10**	**23.20**

Table 1: Measurements of the three adult types of *Oiclus nanus*, sp. n. Abbreviations: length (L), width (W), posterior width (Wp), depth (H).

symmetrically scattered; tergites finely and densely granulose. Punctate tegument restricted to pedipalp patella and chela in adults, absent in juveniles. Pedipalp chela robust, with dorsoexternal surfaces granulose and strongly reticulate. Metasoma moderately to weakly carinated in dorsal and lateral surfaces, intercarinal tegument smooth and polished. Pectines with fulcra variable from moderately well developed to essentially absent; tooth count 7/7. Modal tarsal spine formula 3/3 : 4/4 : 5/5 : 5/5.

Holotype: adult ♂ (RTO: Sco.0409): *Guadeloupe*, Grande-Terre, Saint François, Pointe des Châteaux, 9 July 2009, leg. L. Chazal. ***Paratypes***: 2 adult ♂♂ and 1 juvenile ♂ (RTO: Sco. 0410), with same data as holotype.

Etymology: the selected name is a Latin adjective that means "dwarf" and literally reflects the tiny size of this scorpion, which represents together with *O. questeli* and *Heteronebo pumilus* Armas 1981 (from southeastern Haiti), the smallest adult size known so far amongst all Diplocentrinae.

Distribution (Fig. 5): this scorpion appears to be endemic from the Guadeloupe insular bank, as it has been collected from a single locality in the eastern tip of Grande-Terre, but it seems to occur also in western Basse-Terre (Bouillante) and Les Saintes (Terre-de-Haut); see more details below, in the Remarks section.

Description (adult male holotype). **Coloration** (Fig. 1, 2, 3a) basically light brown, with a dense but diffuse pattern of dark brown reticulate spots over carapace and tergites; pedipalps and metasoma with all carinae and fingers faintly infuscate; carapace with anterior margin, ocular tubercle and eyes blackish; mesosoma venter and pectines yellowish immaculate; legs yellowish, immaculate to very faintly spotted. **Carapace** (Fig. 2a) as long as wide, anterior margin with 2–3 pairs of macrosetae alternated with abundant shorter setae of different size, frontal lobes very wide and rounded,

Figure 2: Adult male holotype of *Oiclus nanus* **sp. n.**: **a)** carapace; **b)** tergites; **c)** pedipalp, dorsal view; **d)** pedipalp, ventral view; **e)** sternopectinal region; **f)** metasomal segments I–III, dorsal view; **g)** metasomal segments I–III, lateral view; **h)** metasomal segments I–III, ventral view; **i)** metasomal segments IV–V and telson, dorsal view; **j)** metasomal segments IV–V and telson, lateral view; **k)** metasomal segment V and telson, ventral view.

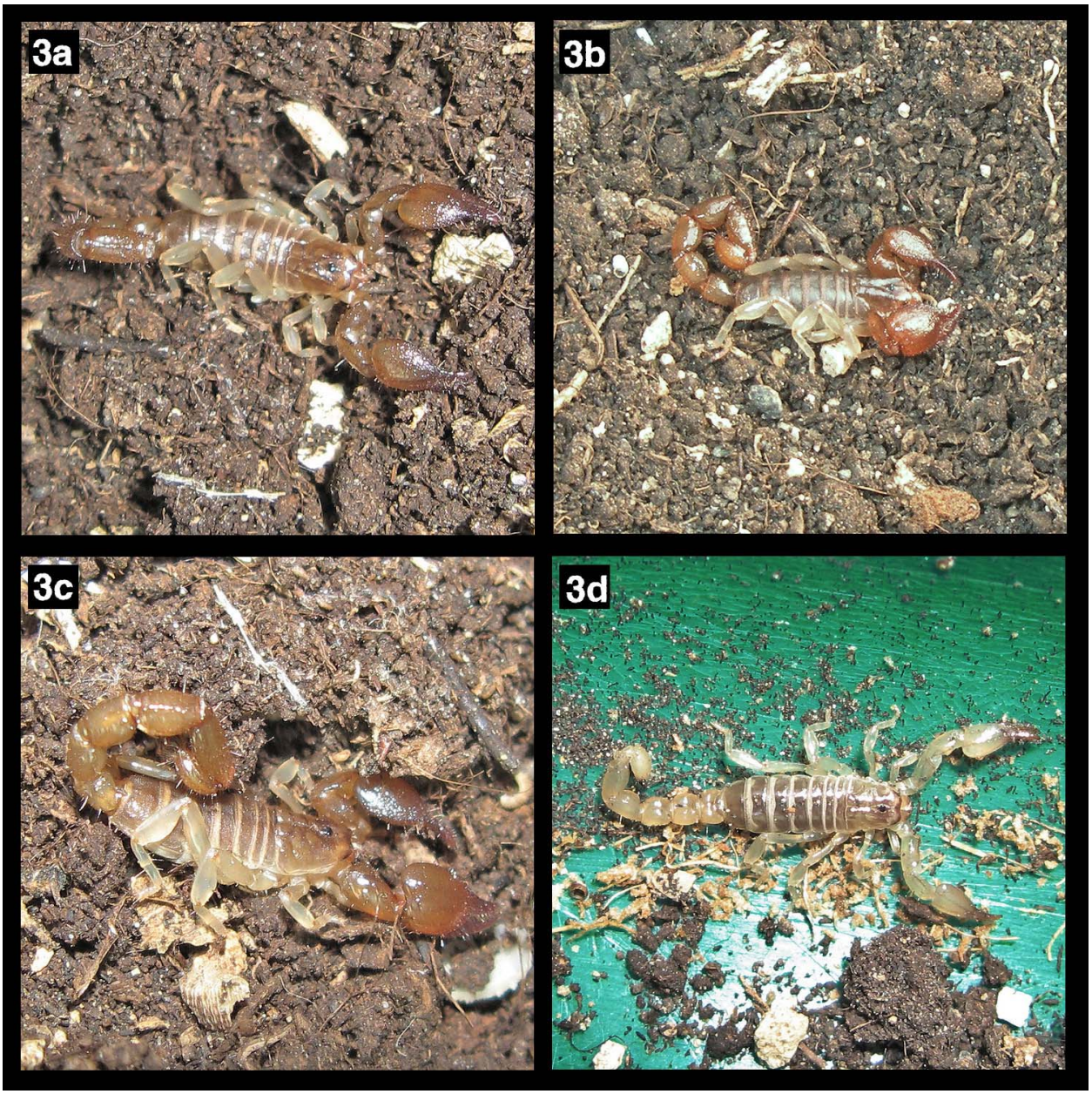

Figure 3: Type specimens of *Oiclus nanus* **sp. n.**, still alive when photographed: **a)** adult male holotype, in its natural habitat; **b-c)** adult male paratypes, in their natural habitat; **d)** juvenile male paratype, in captivity.

frontal notch very wide and shallow. Tegument basically smooth and polished, with circum-ocular, mediolateral and posterolateral areas very finely and densely granulose. All furrows obsolete except for the lateral ocular, posterior median, posterior lateral and posterior marginal, which are relatively narrow and deep. Median eyes relatively small but larger than the lateral eyes, and separated by clearly less than one ocular diameter, median tubercle subtly raised; two pairs of lateral eyes. **Tergites** (Fig. 2b) with median carina vestigial to weak on I–VI, flanked on each side by narrowly depressed furrows; tegument very finely and densely granulose, with irregular and polished lateral areas increasing in size from I–VI. Tergite VII with moderately bilobed lateroposterior region and with two pairs of lateral carinae which are all similar and composed by several large, rounded granules. **Chelicerae** (Fig. 2a) with dentition typical for the family, tegument smooth and polished. **Pedipalps** (Figs. 2c–d) orthobothriotaxic C. Femur deeper than wide, with dorsal surface markedly convex; dorsointernal and ventrointernal carinae very poorly defined, irregularly granulose, ventroexternal

carina absent; tegument smooth and polished, dorsal surface with some coarse granules scattered. Patella with all carinae obsolete except for the dorsointernal (moderate, costate to subgranulose) and the dorsoexternal (weak, costate to subgranulose); tegument smooth and polished except on the internal surface, which is very finely and densely granulose; dorsal and external surfaces sparsely punctate. Chela very short and robust, moderately depressed laterally in cross-section and much deeper than wide; hand with all carinae obsolete to absent, digital carina vestigial, subgranulose, ventrointernal carinae absent, ventroexternal carinae strong, costate to subgranulose and directed essentially towards its articulation condyle, dorsal marginal and dorsointernal carinae strong, irregularly granulose; tegument densely punctate and covered with granulose reticulations which cross even over some of the carinae, dorsointernal surface densely granulose. Fingers very short, densely punctate, acarinate and densely setose, without lobe/notch combination; opposable edges with irregular granulation not arranged in rows. **Legs** (Fig. 1a–b) with tegument smooth and polished; pedal spurs absent; tarsomere II without laterodistal lobes; tarsal spine formula 3/3 : 4/4 : 5/5 : 5/5. **Sternum** (Fig. 2e) type 2, strongly pentagonal, with parallel sides. **Genital operculi** (Fig. 2e) ellipsoidal; genital papillae moderately developed and subtly exposed. **Pectines** (Fig. 2e) hirsute, with 7/7 teeth; fulcra well developed basally but becoming reduced distally in each pecten; basal plate much wider than long; anterior margin weakly notched, posterior margin straight. **Sternites** (Fig. 1b) smooth, polished and moderately hirsute, especially on lateral and posterior margins; VII with lateral carinae moderately granulose and ventrosubmedian carinae weakly granulose; spiracles narrow, oval-elongate. **Metasoma** (Figs. 1a–b, 2f–k) with segment I wider than long and II-V longer than wide; intercarinal tegument smooth and polished, with only a few small and medium-sized granules scattered on dorsal and lateral surfaces, especially on V; segments I–III, with ten carinae, IV with eight, V with five, all densely covered by rigid macrosetae; dorsolateral carinae moderate and irregularly granulose on I–IV, absent on V; lateral supramedian carinae moderately granulose on all segments; lateral inframedian carinae very weak and subcostate on I, vestigial and smooth on II–III, absent on IV–V; ventrolateral carinae moderately crenulate to serratocrenulate on I–II, weakly crenulate on III, very weakly subcrenulate on IV, composed by irregularly arranged conical granules on basal two-thirds of V but replaced on distal third by the ventral transverse carina; ventral submedian carinae strongly crenulate to serratocrenulate on I–II, moderately crenulate on III, very weakly subcostate on IV, absent in V; ventromedian carinae on V strong and composed by irregularly arranged conical granules; ventral transverse carina strong, dentate and evenly arched; segment V slightly longer than telson, with anal arc denticulate, laterodistal lobes bluntly triangular and not projected. Telson oval-depressed and moderately slender; vesicle polished, irregularly granulose and densely covered by rigid macrosetae, ventrobasal area coarsely granulose, subaculear tubercle large, laterally compressed and covered by many rigid setae and a few coarse granules; aculeus short, sharp and strongly curved.

Variation: one adult male paratype (Fig. 3b) is identical to the holotype in size, coloration, morphometrics, sculpture of the tegument, pectinal tooth count and tarsal spine formula, but the other adult male paratype (Fig. 3c; Tab. 1) shows some subtle differences: size slightly larger (supposed to represent another size class), coloration somewhat lighter and less conspicuously spotted, prolateral row of leg I with 3–4 spines, and a few trivial morphometric discrepancies.

A very interesting and strong variation was observed in the development of the pectinal fulcra, which is an unusual trend among scorpions in general: all type specimens show individual variations of this structure both within each pecten and between both pectines. The largest male has fulcra weakly developed to absent, but the other two males (including the holotype), and the juvenile have well developed to vestigial fulcra.

The single juvenile specimen available (Fig. 3d) differs from the adults by the same basic features as in all other diplocentrine scorpions: **1)** coloration with the base conspicuously paler, and the spotted pattern darker and more contrasting; **2)** body overall more slender; **3)** pedipalps and metasoma with weaker carinae; **4)** carapace and tergites smooth and polished; **5)** pedipalps not punctate. The last feature is very important from a taxonomic point of view, as this is the first time that such variation is observed in Diplocentrinae: in all other species of this subfamily with punctate tegument, this character is invariably present in all juvenile and adult instars (R. Teruel, personal observation); this fact must be taken into account when identifying *Oiclus* populations from small samples to avoid taxonomic errors and misinterpretations.

Ecological notes: all specimens of *O. nanus* **sp. n.** were collected under small rocks in dry coastal forest, at an altitude of 12 m a.s.l.; every scorpion burrows a shallow horizontal gallery which follows the lower contour of the rock, and has an enlarged bottom where each individual rests and retreats for shelter (Fig. 4a–b). It occurs both sympatrically and syntopically with two buthid scorpions: *Centruroides barbudensis* (Pocock, 1898) and *Centruroides pococki* Sissom et Francke, 1983.

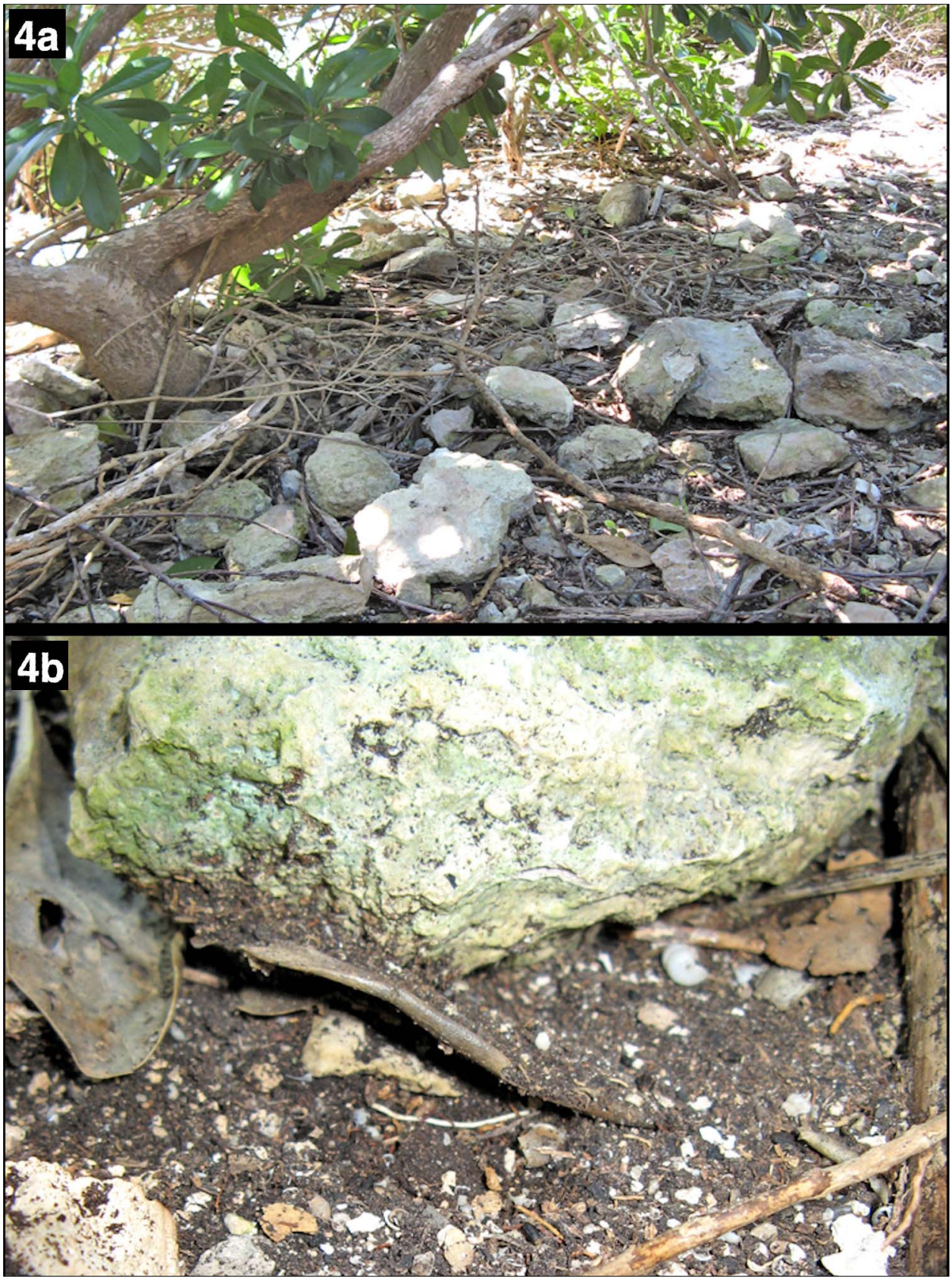

Figure 4: Two views of localities where *Oiclus nanus* **sp. n.** occurs at Pointe des Châteaux: **a)** habitat; **b)** microhabitat.

Figure 5: Known distribution of the genus *Oiclus*: *O. nanus* **sp. n.** (white square with black cross, including the potential records from Bouillantes and Les Saintes), *Oiclus questeli* (black square with white cross), *Oiclus purvesii purvesii* (black square), *Oiclus purvesii sabae* (white square), and *Oiclus* sp. (white square with black dot).

Comparisons (adult males only): *O. nanus* **sp. n.** is most closely related to *O. purvesii* s. s. in overall morphology, but the latter can be unequivocally distinguished by having: **1)** sternites and metasomal segment V punctate; **2)** size considerably larger (28–32 mm); **3)** metasomal segment II wider than long. The two populations assigned to *O. purvesii* s. l. by Francke (1978) as *O. p. sabae* (from Saba) and a supposed hybrid between *O. p. purvesii* and *O. p. sabae* (from Saint Kitts) are in urgent need of a thorough revision, as both will possibly prove to be distinct at species level from *O. purvesii* s. s.; they are not referable to *O. nanus* **sp. n.** either, on the basis of the strong differences in size, metasomal proportions and tarsal spine formula.

On the other hand, *O. questeli* is about the same size and base coloration of *O. nanus* **sp. n.**, but differs conspicuously by: **1)** entire body much less hirsute; **2)** pedipalp chela more robust, with fingers shorter and hand globose (not flattened); **3)** metasoma remarkably less slender, with segments I-III each wider than long; **4)** sternite VII without ventrosubmedian carinae; **5)** pedipalp patella not punctate; **6)** carapace, tergites and pedipalp chela more densely and strongly granulose; **7)** coloration with the spotted pattern much darker and denser.

Remarks

Francke (1978) recorded *O. p. purvesii* from Terre-de-Haut, a small islet of Les Saintes just off the south shore of Basse-Terre, but this record appears to be based upon a misidentification. Very recently, one of us (RT) had the chance to examine a series of high-quality color pictures of one adult male, one adult female and one juvenile from this population (taken by François Meurgey and kindly shared by our friend and arachnid enthusiast Karl Questel), which closely match the types of *O. nanus* **sp. n**. Also, together with these images we received a second series of high-quality color pictures of five juvenile specimens of *Oiclus* collected in Bouillante

(western Basse-Terre), which also look referable to *O. nanus* **sp. n**. Both records are here tentatively referred to this species and appear to indicate that it could be widely distributed in mainland Guadeloupe and at least some of its offshore islets.

Since the classic diplocentrine revision of Francke (1978), *Oiclus* appeared to be the only Antillean genus of this subfamily represented by a single and widespread species, a biogeographical pattern totally different from the one typical of the remaining genera of Diplocentrinae occurring throughout the insular Caribbean: *Cazierius* Francke, 1978 and *Heteronebo* Pocock, 1899 in the Greater Antilles, *Didymocentrus* Kraepelin, 1905 in the Lesser Antilles (Windward Islands) and southern Netherlands Antilles; each of these genera is composed by not less than 10 species, none of which is present in more than one independent island. When *O. questeli* was recently described, Teruel (2008: 98) hypothesized that *Oiclus* was possibly more diverse than suspected. This was quickly confirmed with the discovery of *O. nanus* **sp. n.**, which represents both the third species-level taxon added to this genus and also its southernmost known geographical occurrence. Based on the general correlation of this confirmed species diversity to their distribution, now it seems very likely that *Oiclus* also shares the same biogeographical pattern as the other members of the subfamily: multiple species endemic from each independent insular bank, in this case in the Leeward Islands.

Last, it is not yet possible to prepare a key to the species of *Oiclus* until its type species *O. purvesii* is redescribed according to current taxonomy, and the true identity of all populations previously assigned to it is revised.

Comparative Material Examined

- ***Oiclus purvesii purvesii* (Becker, 1880):** *Antigua*, English Harbour, south end of the island; January 1918, leg. R. Forrest, 1 adult ♀, 1 juvenile ♂ (MCZ 12422). *Montserrat*, Cassara Ghant, 31 May 2002, leg. K. Marske, 1 adult ♀ (MSU).
- ***Oiclus questeli* Teruel, 2008:** *Guadeloupe*, Saint-Barthélemy, Petit Anse, 14 February 2008, leg. K. Questel, 1 adult ♂ holotype (RTO: Sco.0379); same locality, 7 February 2008, leg. K. Questel, 1 juvenile ♂ and 1 juvenile ♀ paratypes (RTO: Sco.0378); Saline, 16 October 2005, leg. K. Questel, 1 adult ♀ paratype (RTO: Sco.0314); Flamand, 30 July 2007; leg. K. Questel, 1 adult ♀ paratype (RTO: Sco.0365).
- ***Oiclus* sp.** (supposed hybrid between *O. p. purvesii* and *O. p. sabae*): *St. Kitts*, St. Thomas Middle Island Parish, Wingfield National Park, Peter Manning Trail, 4 July 2003, leg. M. A. Ivie, 1 juvenile ♀ (MSU).

Acknowledgments

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