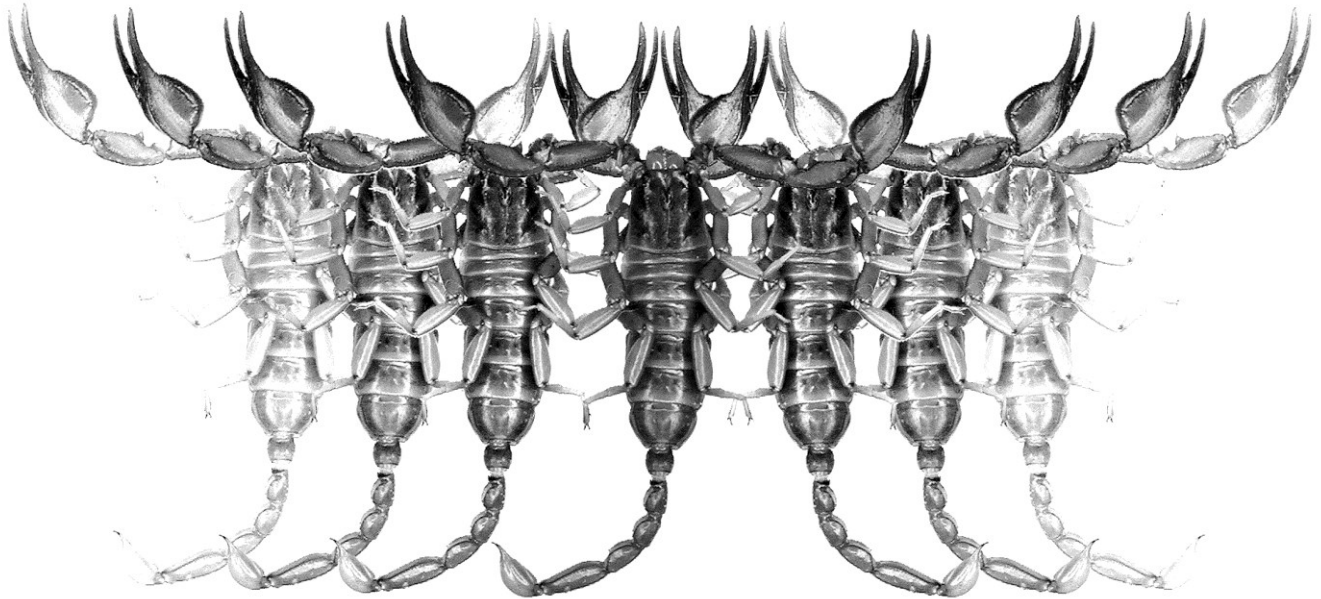


Euscorpius

Occasional Publications in Scorpiology



**On the Distribution of the Genus *Rhopalurus*
Thorell, 1876 (Scorpiones: Buthidae) in the
Southern Caribbean Islands**

Rolando Teruel & Michiel A. C. Cozijn

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On the distribution of the genus *Rhopalurus* Thorell, 1876 (Scorpiones: Buthidae) in the southern Caribbean islands

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Summary

In the present note, we report on the occurrence of the genus *Rhopalurus* Thorell, 1898, in the southern Caribbean islands offshore Venezuela. The only published records are from Isla Margarita and Los Roques, but our study of new specimens (including an important collection assembled by the late Pieter Wagenaar Hummelinck) proved this genus to be widely distributed along several archipelagos such as Los Testigos, Los Frailes, and Los Hermanos, as well as the larger, separate islands of Margarita, Cubagua, La Tortuga, and Coche. These specimens are tentatively referred here to *Rhopalurus laticauda* Thorell, 1876, but their precise identity still warrants further study.

Introduction

The genus *Rhopalurus* Thorell, 1876 is widely distributed and diverse in the Greater Antilles. The most recent taxonomic contribution dealing with its representatives in this area (Teruel & Armas, 2012) listed nine valid and one doubtful species from Cuba, Hispaniola, and Puerto Rico (Mona Island). Otherwise, *Rhopalurus* has long been considered to be absent from the Lesser Antilles in all major revisions and catalogues (Armas, 1988, 2001; Lourenço, 1992; Fet & Lowe, 2000), and its occurrence in the southern Caribbean continental archipelagos located between the Netherlands Antilles and Trinidad & Tobago, has been limited to the records of *Rhopalurus laticauda* Thorell, 1876 from Isla Margarita (González-Sponga, 1984, 1996; Manzanilla & Sousa, 2003), and an undetermined species from Los Roques (Manzanilla & Sousa, 2003).

While revising scorpions deposited at the Naturalis Biodiversity Center (Leiden, The Netherlands), the second author found a previously undetermined collection personally gathered by the late Pieter Wagenaar Hummelinck in the Caribbean islands of Venezuela, which contains a total of eight vials with 11 specimens of *Rhopalurus*. This sample includes several new records of the genus for essentially all the main satellite archipelagos offshore Venezuela. Together with a good additional sample we were able to obtain from the previously known population of Isla Margarita, these materials allow us now to present a complete picture of

the distribution of this genus in the southern insular Caribbean islands.

Dr. Pieter Wagenaar Hummelinck (1907–2003, usually misspelled as “Peter Wagenaar-Hummelinck”) was a Dutch naturalist who studied the flora and fauna of the Netherlands Antilles intensively. He frequently visited these islands, as well as other insular territories of the West Indies and the mainland former colony of Suriname. During 1936–1937 he visited Aruba, Curaçao, Bonaire, and many of the Venezuelan islands, and most of the scorpions mentioned in this paper were collected by him during this period. After retirement, he deposited most of his collection at the University of Utrecht, The Netherlands. The collection was transferred to the Zoological Museum of Amsterdam (ZMA) in 1988; in 2010, the ZMA merged with the Nationaal Natuurhistorisch Museum Naturalis and the National Herbarium into the Naturalis Biodiversity Center, Leiden.

Methods & Materials

Specimens from the NBC collection were studied under a Wild M8 stereomicroscope, measured by a Mitutoyo® digital caliper, and photographed using a Nikon D5100 equipped with a Nikkor AF-S VR 105 mm micro lens, in order to facilitate the confirmation of the identity of the scorpions by the first author. Specimens from the RTO collection were studied under a Zeiss Stemi 2000-C stereomicroscope, equipped with a line-scale ocular micrometer for taking the measurements, and a Canon PowerShot A620 digital camera for the

photographs; the habitus photographs of these same specimens were taken with a Nikon Coolpix S8100 digital camera. Digital images were slightly processed with Adobe Photoshop® 8.0, only to optimize bright and contrast features. Nomenclature and measurements follow Stahnke (1970). All measurements are given in millimeters. Abbreviations of the repositories of the specimens herein studied are: Naturalis Biodiversity Center, Leiden, The Netherlands (NBC), and personal collections of the authors (RTO, MCCL).

Results and Discussion

Rhopalurus cf. laticauda Thorell, 1876

Figures 1–4, Tables 1–2

Records: VENEZUELA, *Dependencias Federales*, Isla La Tortuga, southwest part, 1 August 1936, leg. P. Wagenaar Hummelinck, 1♀ (NBC-433). Archipiélago de Los Hermanos, Isla Pico [= Morro Pando], 20 August 1936, leg. P. Wagenaar Hummelinck, 1 juvenile (NBC-431). Archipiélago de Los Frailes, Isla La Peche, 19 June 1936, leg. P. Wagenaar Hummelinck, 2 juveniles (NBC-426). Archipiélago de Los Testigos, Isla Conejo, inside cave, 17 June 1936, leg. P. Wagenaar Hummelinck, 1 juvenile (NBC-430). Angoletta, 15 June 1936, leg. P. Wagenaar Hummelinck, 2♂♂ (NBC-434). *Estado de Nueva Esparta*, Isla Margarita, Porlamar, Punta Mosquito, 4 June 1936, leg. P. Wagenaar Hummelinck, 1 juvenile (NBC-428). October 2007, local collector, 3♂♂, 4♀♀ (RTO: Sco-0386), 2♂♂, 2♀♀, 2 juveniles (MCCL). Isla Coche, El Guamache, 25 June 1936, leg. P. Wagenaar Hummelinck, 1♂, 1 juvenile (NBC-435). Isla Cubagua, 21 May 1936, leg. P. Wagenaar Hummelinck, 1 juvenile (NBC-424).

In addition, the Wagenaar Hummelinck collection deposited at the NBC contains the following other specimens of *Rhopalurus*:

- *Rhopalurus cf. laticauda*: VENEZUELA, *Falcón*, Península de Paraguaná, Carirubana, Quebrada de la Compañía, 15 February 1937, leg. P. Wagenaar Hummelinck, 1 juvenile (NBC-429). Cerro Transverso, 16 February 1937, leg. P. Wagenaar Hummelinck, 3 juveniles (NBC-427).
- *Rhopalurus caribensis*: COLOMBIA, *La Guajira*, south of Cabo de la Vela, El Cardón, 22 January 1937, leg. P. Wagenaar Hummelinck, 1 juvenile (NBC-436).

Ecological Notes: individuals captured in 2007 at Isla Margarita were kept for several years by the second author (MC), under standard laboratory conditions for such a xerophilic scorpion. Females became adult al-

ways at instar six (i.e., after the fourth nymphal instar) and males reached adulthood at instar five or rarely six, but wild-caught specimens examined herein indicate that also females can mature at instar five. Gestation lasts for about six months, and the single female that gave birth in captivity (the largest measured in Table 2), produced a litter of 26 pulli and died shortly after delivery. Captive raised individuals lived for around three years in captivity.

Comments: all specimens are well preserved in alcohol and most are in good condition; only two specimens are damaged, evidently because of bad handling while collecting (i.e., both were clearly crushed when still alive). The labels inside the vials were produced on a typewriter and are in good condition too; all bear the collection locality and the date of collection. In some specimens the natural coloration pattern has faded due to the long (76–77 years) preservation in ethanol. The glass containers and vials were filled with fresh 70% ethanol after examination of the scorpions. The vials 425 and 432 were not present in the jar; at this moment it is unclear if both are actually missing or misplaced somewhere else in the collection.

The new records herein documented for *Rhopalurus laticauda* sensu lato, greatly increase its known distribution in the insular territories of northern South America; nevertheless, the precise identity of these insular populations could not be satisfactorily established. The main morphological characters such as color pattern (somewhat darker overall, with deep blackish metasomal segment V and telson), very robust pedipalps and metasoma, high pectinal tooth counts, and tegumentary sculpture (coarsely and densely granulate), all clearly indicate that they are not referable to *Rhopalurus caribensis* Teruel et Roncallo, 2008, but generally match instead the mainland taxon that has traditionally been referred to as *R. laticauda*. But as already noted elsewhere, the status of these northern Venezuelan populations of the genus still needs to be clarified (Teruel & Roncallo, 2008; Rojas-Runjaic & Becerra, 2008). For this reason, we referred here to these insular specimens as "*Rhopalurus cf. laticauda*" or "*Rhopalurus laticauda* sensu lato", to indicate that it is both the closest match and a tentative identification only.

Very interestingly, Manzanilla & Sousa (2003) stated that the single specimen they examined from Archipiélago de Los Roques was not conspecific with the remaining populations they identified as to *R. laticauda*, including a good sample from Isla Margarita. Taking into account that *R. caribensis* was described from nearby Colombia and recorded from Venezuela only five years later (Teruel & Roncallo, 2008; Rojas-Runjaic & Becerra, 2008), and thus, it was unknown to Manzanilla & Sousa (2003), it is necessary to study additional specimens from Los Roques (which are lo-

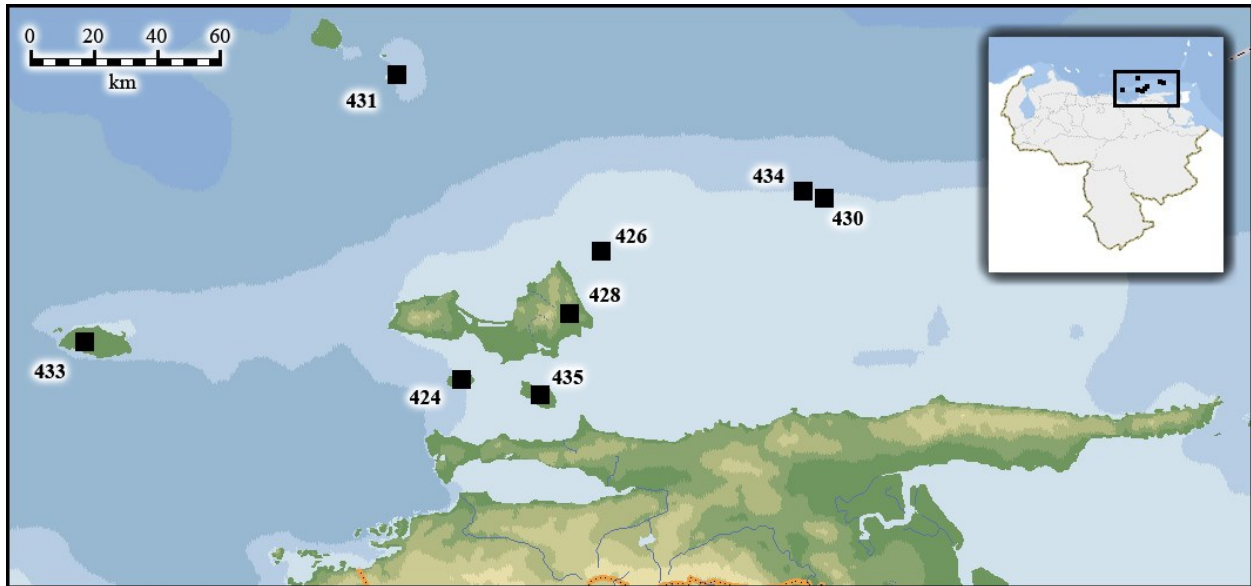


Figure 1: Island records herein given for *Rhopalurus* cf. *laticauda*; the numbers corresponds to the catalogue numbers of every sample from the NBC collection.

Dimensions		♂ (Angoletta)	♂ (Angoletta)	♂ (Isla Coche)	♀ (Isla La Tortuga)
Carapace	L/Wp	4.84/5.02	4.56/5.13	3.84/3.70	3.80/3.82
Mesosoma	L	9.63	10.4	6.94	9.66
Tergite VII	L/W	2.78	3.11	2.19	2.68
Metasoma	L	20.31	18.68	16.76*	14.94
Segment I	L/W/H	3.30/2.89	2.88/2.99	2.54/2.21	2.09/2.30
Segment II	L/W/H	3.82/3.09	3.34/3.05	2.92/2.51	2.70/2.33
Segment III	L/W/H	4.24/3.44	3.79/3.30	3.51/2.74	2.96/2.38
Segment IV	L/W/H	4.46/4.25	4.16/4.30	3.59/3.64	3.39/2.49
Segment V	L/W/H	4.49/4.29	4.51/4.33	4.20/3.70	3.80/2.56
Telson	L	3.50	3.40	3.20*	2.88
Vesicle	L/W/H	2.16/1.79/1.55	2.14/1.81/1.49	1.01/1.44/1.43	1.98/1.36/1.11
Aculeus	L	1.43	1.53	0.97*	1.47
Pedipalp	L	17.78	17.13	14.42	14.23
Femur	L/W	4.35/1.45	4.25/1.45	3.12/1.19	3.20/1.11
Patela	L/W	4.95/2.07	5.04/1.90	4.11/1.94	4.12/1.60
Chela	L	8.48	7.84	7.19	6.91
Hand	L/W/H	3.82/2.49/2.41	3.93/2.61/2.58	3.02/2.18/1.91	2.28/1.44/1.30
Movable finger	L	5.49	5.60	4.55	4.77
Total	L	38.28	37.04	30.74*	31.28

Table 1: Measurements (mm) of four adults of *Rhopalurus* cf. *laticauda* from NBC. Abbreviations: length (L), width (W), posterior width (Wp), depth (H), left (L), right (R), aculeus tip broken (*).

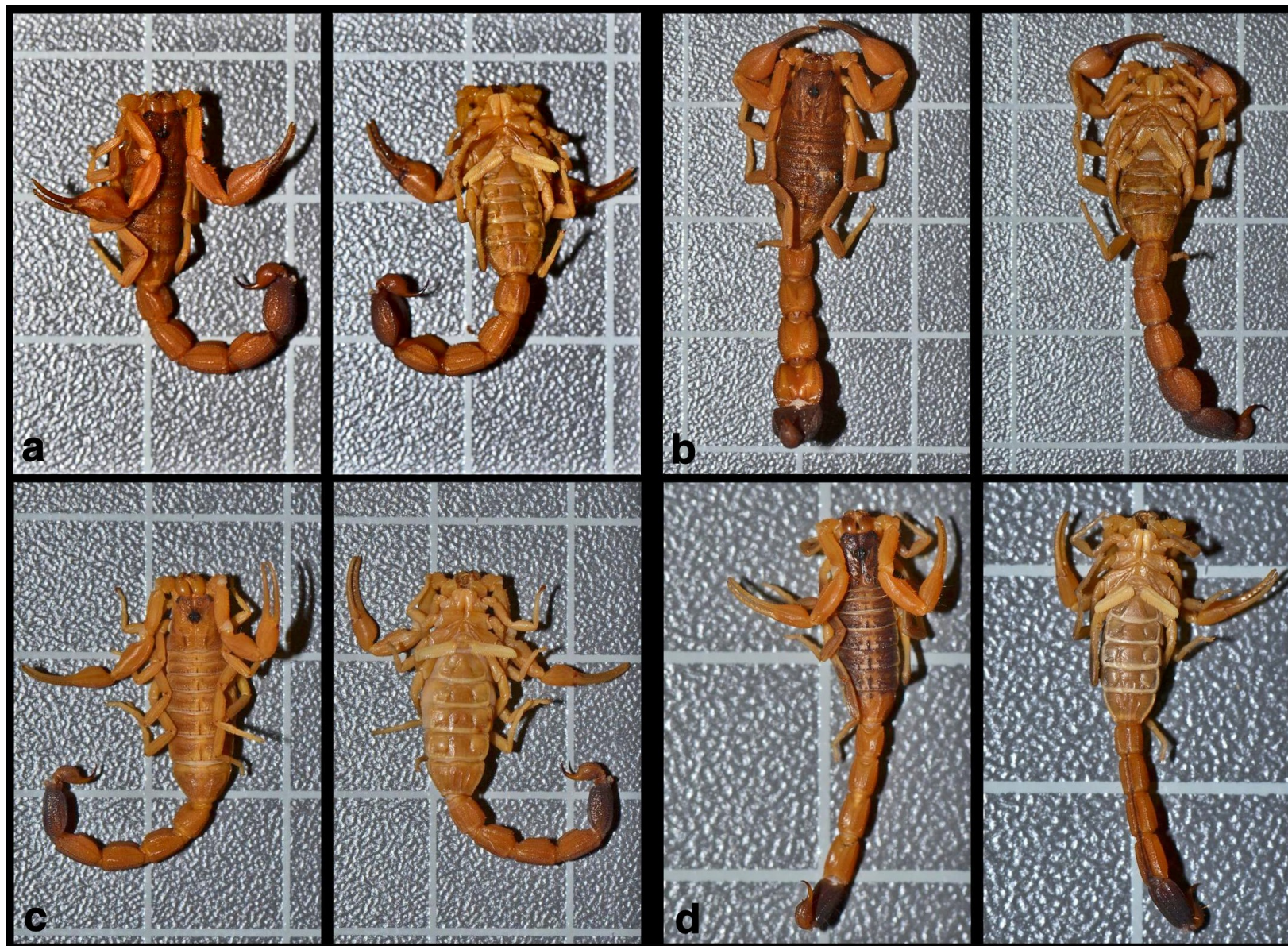


Figure 2: Specimens of *Rhopalurus* cf. *laticauda* from the Caribbean islands of Venezuela (NBC), complete dorsal and ventral views: **a)** male from Isla Coche; **b)** male from Angoletta; **c)** female from Isla La Tortuga; **d)** juvenile from Isla Conejo.



Figures 3-4: **3 (top).** Specimens of *Rhopalurus* cf. *laticauda* from Isla Margarita (MCCL), complete dorsal view: male (left), female (right), both are small-sized adults. **4 (bottom).** Female *Rhopalurus* cf. *laticauda* from Isla Margarita (RTO: Sco-0386), pectines with a symmetric anomaly consisting in fusion of basal tooth: **a)** complete view: **b)** close-up.

cated farther west than the localities recorded herein) to clarify the specific identity of this yet another insular population.

The specimens herein studied confirmed that the differences previously recorded by Teruel & Roncallo (2008, 2010) in pectinal tooth count between *R. caribensis* and *R. laticauda* sensu lato, although slight, still

remain diagnostic. The single juvenile female of the former has 21/20 pectinal teeth, whilst among the whole sample of the latter the counts per pectines were as follows: males, 23 (9), 24 (14), 25 (3); females, 21 (10), 22 (10), 23 (4).

Another female from Isla Margarita (RTO: Sco-0386) has a tooth count of 20/19, but it was excluded

Dimensions		♂ (RTO)	♂ (MCCL)	♂ (MCCL)	♀ (MCCL)	♀ (MCCL)
Carapace	L/Wp	5.70/5.70	4.27/5.06	4.05/4.48	6.21/6.88	5.32/5.83
Mesosoma	L	11.85	10.19	9.86	15.2	11.59
Tergite VII	L/W	3.50/5.61	2.87	2.66	4.16	3.23
Metasoma	L	26.94	17.50	16.91	25.82	19.99
Segment I	L/W/H	3.30/3.45	2.60/2.67	2.38/2.39	4.19/3.82	3.17/3.16
Segment II	L/W/H	3.98/3.54	3.34/2.78	2.96/2.55	5.17/4.00	3.66/3.27
Segment III	L/W/H	4.44/3.97	3.39/2.81	3.13/2.77	5.29/4.45	3.90/3.44
Segment IV	L/W/H	4.82/5.00	3.91/3.37	3.86/3.27	5.58/4.87	4.30/3.70
Segment V	L/W/H	5.20/4.90	4.26/3.55	4.58/3.28	5.59/4.98	4.96/3.77
Telson	L	5.20	3.61	3.16	4.61	4.05
Vesicle	L/W/H	2.60/2.18/1.89	2.01/1.62/1.47	1.95/1.58/1.42	2.79/2.54/2.25	2.45/2.20/1.80
Aculeus	L	2.60	1.63	1.37	2.65	2.07
Pedipalp	L	20.97	17.35	15.59	22.42	19.39
Femur	L/W	4.79/1.50	4.25/1.20	3.90/1.06	5.41/1.86	4.66/1.67
Patela	L/W	5.68/2.30	5.23/1.78	4.47/1.66	6.49/2.74	5.73/2.22
Chela	L	10.50	7.87	7.22	10.52	9.00
Hand	L/W/H	4.17/3.09/3.20	3.58/2.35/1.99	2.98/2.04/1.82	5.12/2.93/2.78	4.44/2.28/2.61
Movable finger	L	6.33	5.59	4.91	7.25	6.42
Total	L	44.49	35.57	33.98	51.84	40.95

Table 2: Measurements (mm) of five adults of *Rhopalurus* cf. *laticauda* from Isla Margarita. Abbreviations: length (L), width (W), posterior width (Wp), depth (H), left (L), right (R).

from the range given above because it clearly represents an anomaly (Fig. 4): in each pecten, the basalmost tooth is greatly enlarged and actually seems to represent a fusion of at least two teeth; both pectines are strikingly symmetrical, which is the first documented case. According to our personal observations, fused teeth are very common among scorpions, but almost always are restricted to one pectine only; the very few double cases we have found have always been asymmetrical, because different numbers and positions of teeth are involved.

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