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# Another new species of *Pseudouroplectes* Lourenço, 1995 from Madagascar (Scorpiones, Buthidae)

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**Abstract**

A new species of the endemic Malagasy genus *Pseudouroplectes* Lourenço, 1995 (family Buthidae) is described from spiny forests of the southwestern portion of the island. The holotype was obtained in the forests of Ifaty, north of Toliara. With the description of this species, the distributional pattern of this genus is confined to dry forest formations in the south and southwest. A key is proposed to the known species.

**Keywords**

Scorpion, *Pseudouroplectes*, Madagascar, Toliara, new species

## Introduction

As already discussed by Lourenço and Goodman (2006), the species of genus *Pseudouroplectes*, which are soil-dwelling scorpions of the family Buthidae (Lourenço 2004), are rare. In Madagascar the best-studied soil scorpions are represented by members of the endemic family Microcharmidae (Lourenço et al. 2006). *Pseudouroplectes*

was originally described based on two females of *P. betschi* Lourenço, 1995, collected in the dry southwestern spiny bush formation at Andramanoetse Be, Plateau Mahafaly, Toliara Province (Lourenço 1995). Subsequently, a single specimen of another *Pseudouroplectes* species, *P. pidgeoni* Lourenço & Goodman, 1999, was collected in the extreme southeastern dry forests of the Parc National d'Andohahela (parcel 2), Toliara Province (Lourenço and Goodman 1999). This animal was collected in a soil litter sample from the spiny bush parcel of the reserve, within a few kilometers of the ecotone between dry and wet forest formations. Only several years later, additional material was obtained of the genus *Pseudouroplectes*. This led to the description of a third species, *Pseudouroplectes maculatus* Lourenço & Goodman, 2006. New specimens of *Pseudouroplectes* have been collected due to the efforts of Dr. Brian Fisher and colleagues at the California Academy of Sciences (CAS). Over the past few years, the CAS field team conducted systematic invertebrate inventories at various sites across Madagascar, including the dry vegetational formations, employing pitfall traps and different methods of soil litter extraction.

More recently, examination of some scorpions collected by the senior author in the dry vegetation sites of Toliara Province (Lourenço et al. 2008), revealed one more new species of *Pseudouroplectes*, which is described here.

## Distributional pattern presented by the genus *Pseudouroplectes*

The distributional pattern of the genus *Pseudouroplectes* was discussed in detail by Lourenço and Goodman (2006), who presented details and a list of known localities for members of this genus. In summary, members of this genus, including the new species described herein, are restricted to the extreme southern dry forest formations. *Pseudouroplectes betschi* and *P. pidgeoni* apparently present a parapatric or even a small sympatric zone of distribution in the extreme southern portion of the island. A similar situation is observed between *P. maculatus* and the new species described here, with the two species presenting, at least, a small zone of sympatry (Fig. 13). One species, *Pseudouroplectes betschi*, is known from a single locality. This very restricted distribution can eventually be attributed to incomplete sampling collections. At the same time, the totality of the southwestern portion of the island was extensively prospected by Brian Fisher and colleagues. A more plausible explanation is the existence of very particular habitats to which some species are specifically adapted. In the case of scorpions, the possible ecological gradients responsible for these microendemic habitats are vegetation cover and humidity.

## Methods

Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope with a drawing tube (camera lucida) and an ocular micrometer. Measurements

follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) while morphological terminology mostly follows Hjelle (1990).

## Taxonomic treatment

Family Buthidae C.L. Koch, 1837
Genus *Pseudouroplectes* Lourenço, 1995

***Pseudouroplectes lalyae* sp. n.**
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Figs 1, 3–8

**Type material:** Male holotype. Madagascar, Toliara Province, NE Ifaty, spiny forest thicket, 30 m alt., IX/2004 (W. R. Lourenço) (MNHN). Paratypes. Toliara Province,

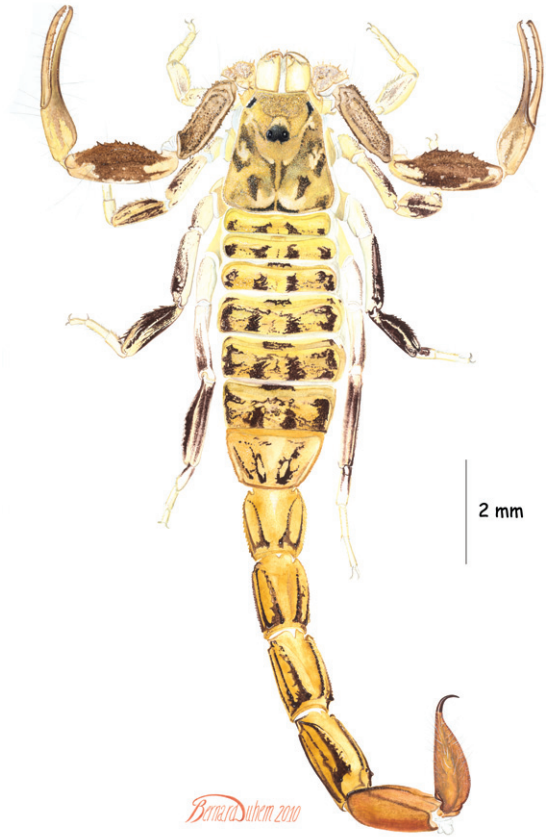



**Figure 1.** Habitus of *Pseudouroplectes lalyae* sp. n., male holotype. Scale bar = 2 mm.

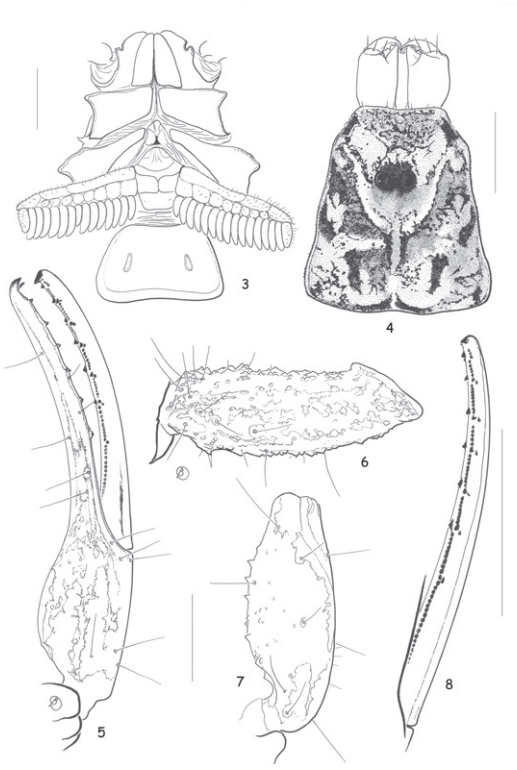
**Figure 2.** Habitus of *Pseudouroplectes maculatus*, female paratype. Scale bar = 2 mm.

Forêt de Tsinjoriaky (22°48'08" S, 43°25'14" E), 6.2 km 84° E Tsifota, 70 m alt., 6–10/III/2002 (Fisher & Griswold et al.), general collecting, spiny forest-thicket, 2 male juveniles (CAS – MNHN). Note: The two paratypes were previously misidentified as *P. maculatus* (Lourenço & Goodman, 2006).

**Etymology:** The patronym is homage to Laly Ythier, daughter of the junior author.

**Diagnosis:** Small scorpions, when compared with the average size of most species of micro-buthid genera, and measuring up to 20.57 mm in total length (see morphometric values after the description). General coloration reddish-yellow with four longitudinal stripes starting on the posterior edge of carapace and running over tergites I to VII; dark spots over the pedipalps, legs and metasomal carinae. Carinae and granulations moderately to strongly marked.

**Relationships:** The new species can be readily distinguished from all the other species of the genus *Pseudouroplectes* Lourenço, by (i) presence of four longitudinal dark stripes running from the carapace and over all tergites, (ii) pedipalps, legs and




**Figures 3–8.** *Pseudouroplectes lalyae* sp. n. Male holotype. **3** Ventral aspect, showing coxapophysis, sternum, genital operculum, pectines and sternite III with spiracles **4** Carapace and chelicerae, dorsal aspect. **5–7** Trichobothrial pattern of the pedipalp **5** Chela, dorsoexternal aspect **6** Femur, dorsal aspect **7** Patella, dorsal aspect **8** Disposition of granules on the dentate margins of the pedipalp chela movable finger. Scale bars = 1 mm.

metasomal carinae intensely spotted, (iii) moderately marked carinae on tergites and metasomal segments, and (iv) pedipalps strongly granular.

Description based on male holotype.

**Coloration.** Reddish-yellow with four longitudinal dark stripes which start on the posterior edge of carapace and run over tergites I to VII. Carapace, pedipalps, and legs intensely marked with dark spots; carinae of metasomal segments densely spotted. Venter and chelicerae yellowish without spots.

**Morphology.** Carapace with a moderately to strongly marked granulation; anterior margin almost straight. Carinae weak; furrows inconspicuous. Median ocular tubercle distinctly on the anterior third of the carapace; median eyes separated by one ocular diameter. Three pairs of lateral eyes. Sternum subpentagonal. Mesosoma: tergites moderately granular. Median carina moderate to weak in all tergites. Tergite VII pentacarinate. Venter: genital operculum divided longitudinally, each plate having a more or less subtriangular shape. Pectines large: pectinal tooth count 16–15 (male paratypes with

15–16 and 16–16); basal middle lamellae of the pectines not dilated; fulcra inconspicuous. Sternites smooth with short semi-slit-like spiracles; VII punctuated and acarinated. Metasoma: segments I to IV with 10 carinae, moderately crenulate; ventral carinae reduced to vestigial on segments I to IV; intercarinal spaces weakly granular. Segment V rounded with five carinae. Telson has a very elongated "pear-like" shape, smooth with strong setation; aculeus short, weakly curved; subaculear tooth absent. Cheliceral dentition characteristic of the family Buthidae (Vachon, 1963); fixed finger with two moderate basal teeth; movable finger with two very weak and fused basal teeth; ventral aspect of both finger and manus with dense, long setae. Pedipalps: femur pentacarinate; patella with seven carinae; internal face of patella with 7–8 spinoid granules; chela with vestigial carinae; all faces moderately to strongly granular. Fixed and movable fingers with 7–8 almost linear rows of granules; two accessory granules present at the base of each row; extremity of fixed and movable fingers with one long and sharp denticle. Trichobothriotaxy; orthobothriotaxy A-α (Vachon, 1974, 1975). Legs: tarsus with very numerous fine median setae ventrally. Pedal spurs reduced; tibial spurs absent.

**Morphometric values** (in mm) of the holotype. Total length (including telson), 20.57. Carapace: length, 2.43; anterior width, 1.43; posterior width, 2.14. Metasomal segments. I: length, 1.43; width, 1.28. II: length, 1.71; width, 1.14. III: length, 1.86; width, 1.00. IV: length, 2.14; width, 1.00. V: length, 3.00; width, 1.00; depth, 1.00. Telson: length, 2.57. Vesicle: width, 0.71; depth, 0.71. Pedipalp: femur length, 1.78, width, 0.57; patella length, 2.36, width, 0.86; chela length, 3.14, width, 0.71, depth, 0.64; movable finger length, 2.07.

**Key to the known species of *Pseudouroplectes***

1. Pale scorpions, yellowish to reddish-yellow, with or without spots..... **2**
– Dark scorpions with confluent blackish spots over the body and appendages... ..... ***P. maculatus*** **(Fig. 2)**
2. Coloration yellowish without any spots; pectinal tooth count 18/20..... ..... ***P. betschi*** **(Figs 9–10)**
– Coloration yellowish with two or four longitudinal reddish-brown stripes over the tergites; pectinal tooth count 14/16..... **3**
3. Two longitudinal brownish stripes over the tergites; carapace, pedipalps and metasomal segments without spots..... ***P. pidgeoni*** **(Figs 11–12)**
– Four longitudinal brownish stripes over the tergites; carapace, pedipalps and metasomal segments strongly spotted..... ***P. lalyae*** **sp. n. (Fig. 1)**

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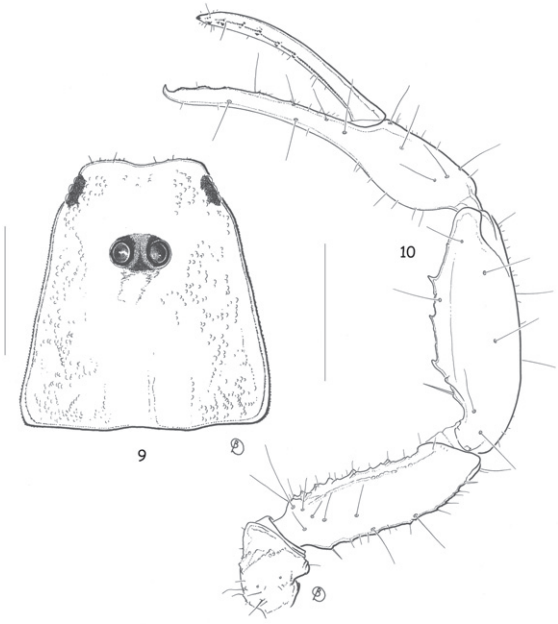
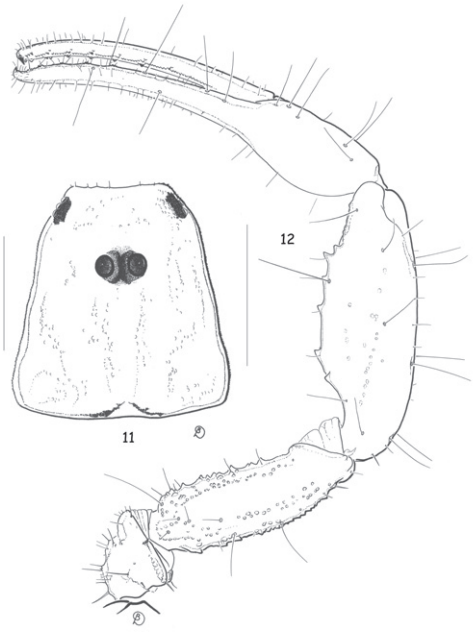



**Figures 9–10.** *Pseudouroplectes betschi*, male from Cap Sainte Marie. Carapace and pedipalp, dorsal aspect, showing the absence of pigmentation. Scale bars = 1 mm.




**Figures 11–12.** *Pseudouroplectes pidgeoni*, male from Itampolo. Carapace and pedipalp, dorsal aspect, showing the very reduced pigmentation pattern. Scale bars = 1 mm.

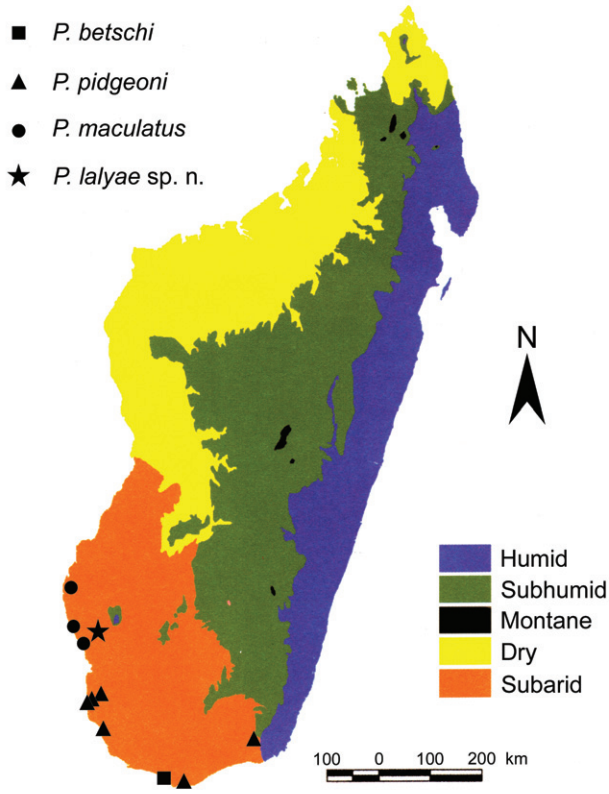



**Figure 13.** Vegetation map of Madagascar showing the known distribution of *Pseudouroplectes* species.

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