

Chelicerata (Scorpiones)

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A checklist of the scorpions recorded from the Brandberg mountain massif, in the Omaruru District of northwestern Namibia, is provided. *Opisthophthalmus lamorali* Prendini, sp. nov., endemic to the Omaruru and Khorixas Districts and common on the rocky flats surrounding the Brandberg, is described. This new species is most closely related to *Opisthophthalmus cavimanus* Lawrence, which occurs farther north in the Khorixas and Opuwo Districts. The known distributional ranges of *O. lamorali* sp. nov. and *O. cavimanus* are mapped, illustrating that these species are parapatric. Meristic data for both species are tabulated.

INTRODUCTION

The scorpion fauna of southern Africa (south of the 15° latitude) is fairly speciose. Based on the recent world catalogue of Fet *et al.* (2000), the subregion contains 13 (8%) of the 155 described genera and 129 (10%) of the 1258 described species. Moreover, five (38%) genera and 111 (86%) species are endemic to the subregion (Prendini 1995). Three genera, *Opisthophthalmus* C. L. Koch, 1837 (Family Scorpionidae), *Parabuthus* Pocock, 1890 and *Uroplectes* Peters, 1861 (Family Buthidae), together comprise more than 90 (69%) of the species in southern Africa, although this percentage will be far greater, based on a forthcoming revision of *Opisthophthalmus*, in which approximately 80 species are to be recognised (L. Prendini in prep.).

Namibia has the highest species richness and endemism of scorpions in southern Africa. All four families, seven (64%) genera, and 56 (43%) species of southern African scorpions occur in Namibia, of which one (8%) genus and at least 26 (20%) species are endemic (Lamor 1979; Prendini 1995, 2000a, unpublished data). In the present contribution, a new species of *Opisthophthalmus*, endemic to the Omaruru and Khorixas Districts of northwestern Namibia and common on the rocky flats surrounding the Brandberg, is described. Recognition of this new species brings the total number of Namibian species to

57, and the number of Namibian endemics to 27. Fourteen scorpion species, in five genera and three families, are now recorded from the vicinity of the Brandberg Massif (Table 1).

MATERIAL AND METHODS

Abbreviations for collections in which material is deposited, are as follows: Alexis Harington Private Collection, University of the Witwatersrand, Johannesburg, South Africa (AHC); Albany Museum, Grahamstown, South Africa (AMGS); American Museum of Natural History, New York, NY (AMNH); California Academy of Sciences, San Francisco, CA (CAS); National Museum of Namibia, Windhoek (NMNW); Natal Museum, Pietermaritzburg, South Africa (NMSA); South African Museum, Cape Town (SAMC); Transvaal Museum, Pretoria, South Africa (TMSA).

Specimens were illustrated using a Wild stereomicroscope and camera lucida. Measurements were taken with Mitutoyo® digital calipers (model NTD12-6" C). Colour designation follows Smithe (1974, 1975, 1981), trichobothrial notation follows Vachon (1974), and mensuration follows Stahnke (1970) and Lamor (1979). Morphological terminology follows Couzijn (1976) for the segmentation of legs, Hjelle (1990) and Sissom (1990) for the segmentation of pedipalps, Prendini (2000b) for

Table 1. Scorpion species recorded from the vicinity of the Brandberg Massif, Namibia. Locality data are abbreviated as follows: rocky slopes of Brandberg (RM); rocky flats surrounding Brandberg and in gorges intersecting Brandberg (RF); sandy loam flats surrounding Brandberg and in gorges intersecting Brandberg (SF); sand dunes against inselbergs to southwest of Brandberg (SD). Habitat data are abbreviated as follows: in rock crevices and under exfoliations (CE); under stones (US); under tree bark (UB); burrows under stones (BS); burrows in open ground (BO). Data compiled from Prendini (1995, unpublished data).

| | Locality | | | | Habitat | | | | |
|--|----------|----|----|----|---------|----|----|----|----|
| | RM | RF | SF | SD | CE | US | UB | BS | BO |
| Buthidae | | | | | | | | | |
| <i>Hottentotta conspersus</i> (Thorell, 1876) | x | x | | | | x | | | |
| <i>Parabuthus brevimanus</i> (Thorell, 1876) | | | x | | | | | | x |
| <i>Parabuthus gracilis</i> Lamoral, 1979 | | | | x | | | | | x |
| <i>Parabuthus granulatus</i> (Ehrenberg, 1831) | | | x | | | | | | x |
| <i>Parabuthus stridulus</i> Hewitt, 1914 | | | x | | | | | | x |
| <i>Parabuthus villosus</i> (Peters, 1862) | x | x | | | | | | x | |
| <i>Uroplectes otjimbinguensis</i> (Karsch, 1879) | | | x | | | | x | | |
| <i>Uroplectes planimanus</i> (Karsch, 1879) | x | x | | | x | x | | | |
| Ischnuridae | | | | | | | | | |
| <i>Hadogenes tityrus</i> (Simon, 1888) | x | | | | x | | | | |
| Scorpionidae | | | | | | | | | |
| <i>Opisthophthalmus carinatus</i> (Peters, 1861) | x | x | | | | | | x | |
| <i>Opisthophthalmus jenseni</i> (Lamoral, 1972) | | | | x | | | | | x |
| <i>Opisthophthalmus lamoralis</i> Prendini, sp. nov. | | x | | | | | | x | |
| <i>Opisthophthalmus ugabensis</i> Hewitt, 1934 | x | | | | | | | x | |
| <i>Opisthophthalmus wahlbergii</i> (Thorell, 1876) | | | x | | | | | | x |

the pedipalpal and metasomal carinae, and Stahnke (1970), Lamoral (1979), and Sissom (1990) for the remaining features.

SYSTEMATICS

Opisthophthalmus lamoralis Prendini, sp. nov.

Figures 1–14.

Opisthophthalmus undulatus ugabensis: Hewitt 1934: 408–410 (misidentification AMGS 6574: ♂ only, not ♀ lectotype), Plate 1, Figures 1, 4.

Opisthophthalmus cavimanus ugabensis: Lawrence 1955: 238; Lawrence 1969: 115; Lamoral & Reynders 1975: 553 (misidentifications AMGS).

Opisthophthalmus cavimanus: Lamoral 1979: 691, 754 (misidentifications AMGS 6574: ♂ only, not ♀ lectotype; NMNW 133).

Opisthophthalmus litoralis: Lamoral 1979: 729 (misidentification NMSA 10711).

REMARKS: The subspecies, *Opisthophthalmus undulatus ugabensis* Hewitt, 1934, was described from a pair of syntypes. In the original description, Hewitt (1934: 408) noted: "The male of this form is near to *cavimanus* Lawrence ... which I think should be regarded as a subspe-

cies of *undulatus* Kraepelin ... differing therefrom as follows: central areas of sternites with very finely roughened surfaces which under magnification prove to be very finely wrinkled but irregularly in zigzag fashion and discontinuously instead of being mostly in parallel transverse lines as in *cavimanus*; caudal segment IV is not faintly wrinkled below, and the inferomedian keels are distinctly represented by rows of isolated granules, whilst on the same segment distinct granular infero-lateral keels occur."

Lamoral (1979) placed *Opisthophthalmus undulatus* Kraepelin, 1908 in synonymy with *Opisthophthalmus schultzei* Kraepelin, 1908, and discovered that Hewitt's syntypes of *O. undulatus ugabensis* were not conspecific. Lamoral realised that the ♀ syntype was a distinct species, which he designated as the lectotype of *Opisthophthalmus ugabensis* Hewitt 1934, but considered the ♂ syntype to be conspecific with *Opisthophthalmus cavimanus* Lawrence, 1928.

Recently, Hewitt's syntypes of *O. undulatus ugabensis* (AMGS 6574) were re-examined. In addition to the lectotype of *O. ugabensis* (♀), designated by Lamoral, two additional conspecifics (juv ♂, juv ♀), not mentioned by Hewitt or Lamoral, were discovered. As noted by Lamoral, the ♀ lectotype of *O. ugabensis* is not conspecific with the ♂ syntype of *O. undulatus ugabensis* (placed in synonymy with *O. cavimanus* by Lamoral). However, the ♂ syntype is also not conspecific with the lectotype and paralectotypes of *O. cavimanus*, and is hereby removed from synonymy with the last mentioned species. The ♂ syntype is an undescribed species, as previously realised by Lawrence, who wrote "sp. n." on a handwritten label accompanying four additional specimens from Uis (AMGS), but never published a description. Lawrence (1955: 238; 1969: 115) instead referred to this taxon as *Opisthophthalmus cavimanus ugabensis* Hewitt, 1934. The four specimens from Uis, referred to as *O. cavimanus ugabensis* by Lawrence (1969:

115), are the same specimens which Lawrence labelled "sp. n." This species is here described as *Opisthophthalmus lamorali* sp. nov.

TYPE MATERIAL: Hewitt's adult ♂ syntype of *O. undulatus ugabensis* (AMGS 6574) is hereby designated as the holotype of *O. lamorali* sp. nov. Holotype ♂ (AMGS 6574), 'Ugab River [NAMIBIA, Erongo Region, Omaruru Distr.], R.D. Bradfield'. The following additional specimens are designated as paratypes. NAMIBIA: Erongo Region, Omaruru Distr., ♂ (SAMC C1367, formerly B6458), 'Uis, Brandberg Area [21°09'S 14°47'E]'; juv ♂ (NMSA 17185, formerly AMGS 6458), 'Brandberg area, Uis'; 2 ♂♂ 2 ♀♀ (AMGS), ♂ (TMSA 18201), 'Uis [21°13'S 14°51'E], 1968, J.J. Nel'; subadult ♂ (TMSA 18199), same data, except '13.ii.1968'; subadult ♀ (TMSA 10028), same data, except 'i.1969'; ♀ (TMSA 18290), same data, except '30.iii.1969'; ♂ (TMSA 18200), same data, except 'x.1969'; ♂ (NMNW 1792), 'Uis townlands [21°13'S 14°51'E], 21.i–27.ii.1995, E. Marais, preservative pitfall trap'; 9 ♂♂ 3 ♀♀ (NMNW 1896), ♂ ♀ (AMNH), ♂ ♀ (CASC), 'Uis, 2 km from town, 21°13'S 14°52'E, 780 m, 15.i.1998, L. Prendini & E. Scott, night collecting with UV detection'; ♂ (NMNW 1901), 'Messum Crater, 21°27'S 14°13'E, 9.iv.2000, M. Griffin, under stone, gravel plains'; 2 ♀♀ subadult ♂ (NMNW 1897), 'Messum River, hills near intersection with road to Brandberg-Wes, 21°16'S 14°27'E, 700 m, 17.i.1998, L. Prendini & E. Scott, under dark metallic stones in area with Welwitschias'; ♂ (NMSA 10711), 'Brandberg Wes, 20 mi from coast on road [21°15'S 14°10'E], 29.iv.1964, W. Steyn' [misidentified as *O. litoralis* by Lamoral (1979: 729)]; ♂ (NMNW 1898), 'Brandberg-Wes Myn, 21°01'S 14°09'E, 300 m, 17.i.1998, L. Prendini & E. Scott, stoney plain with small drainage, under stone'; 4 subadult ♂♂ subadult ♀ 2 juv ♂♂ juv ♀ (NMNW 1900), 'Messum valley mouth, Brandberg, 21°14'S 14°31'E, 690 m, 17.iv.1999, S. van Noort, under rock, gravel

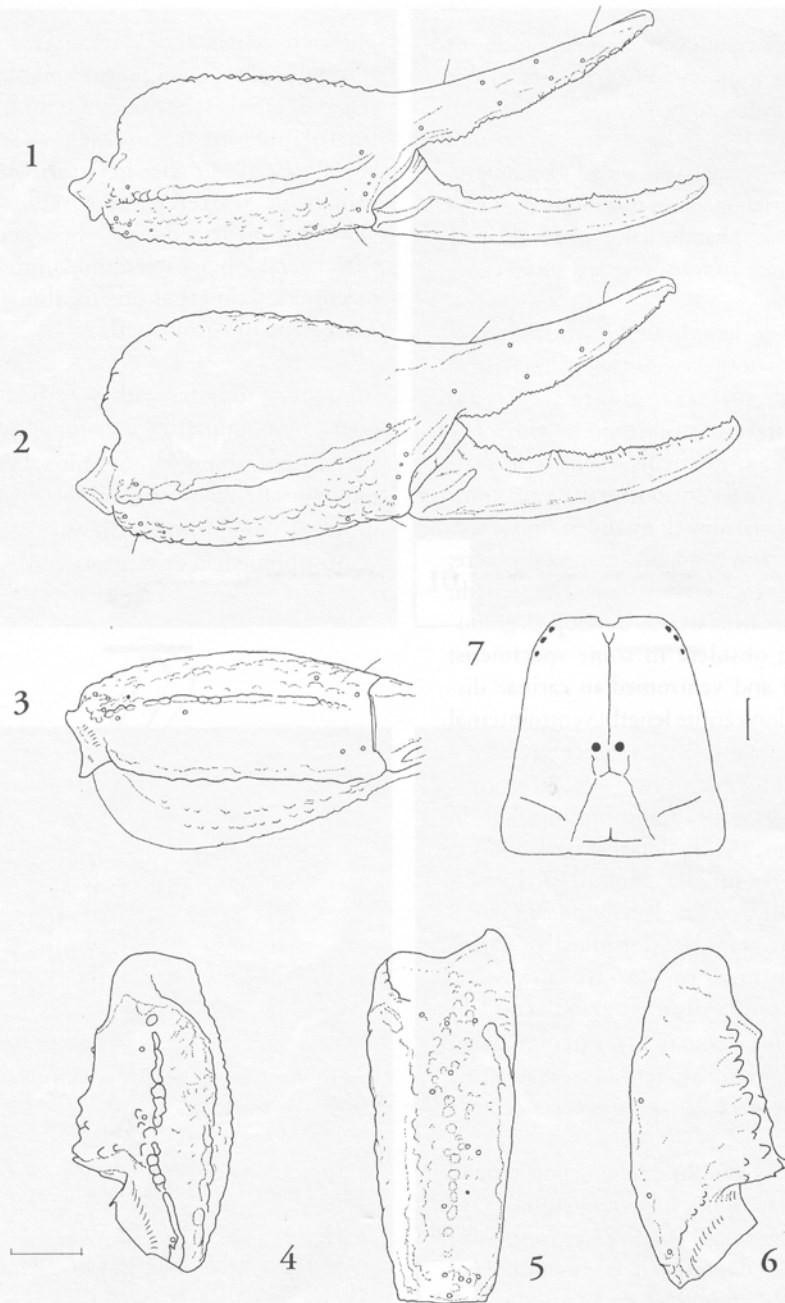
plain with Welwitschias'; subadult ♂ (NMNW 1899), 'Numaskloof, Brandberg, 21°07'S 14°26'E, 470 m, 17.i.1998, L. Prendini & E. Scott, under stone at base of rocky slope'; Kunene Region, Khorixas Distr., ♂ (NMNW 133), 'Huab River [20°45'S 13°48'E], 7.vi.1964, W. Steyn' [misidentified as *O. cavimanus* by Lamoral (1979: 691)]; ♂ (NMNW 728), 'Gai-As waterhole [20°46'S 14°02'E], S. Louw, 9.iv.1979'; subadult ♂ (NMNW 1320), 'Groß Gai-As [20°49'S 14°03'E], E. Griffin, 5.viii.1985'; 3 ♂♂ subadult ♂ juv ♀ (NMNW 1647), 'Klein Gai-As [20°53'S 14°08'E], 4.viii.1985, M. Griffin, under stones'; ♂ (NMNW 1773), 'between Farms Eersbegin 675 and Ruspoort 669 [20°08'S 14°23'E, dubious locality], 14.xii.1988, A. Harington'.

ADDITIONAL MATERIAL: NAMIBIA: Erongo Region, Omaruru Distr., 11 ♂♂ (AHC 1742–1744, 1748, 1764, 1929, 3367, 3369–3371, 3453), 3 ♀♀ (AHC 1745–1747), subadult ♂ (AHC 3368), Amis gorge, Brandberg [21°11'S 14°28'E], 30.i.1981, A. Harington; ♂ (AHC 3296), same data, except 'H. Pager'; ♂ (AHC 3202), Brandberg, W foot [21°09'S 14°42'E], 3.xii.1982, S. Braine; subadult ♂ (AHC 1749), Numas gorge, Brandberg [21°07'S 14°25'E], 30.i.1981, A. Harington; 2 ♂♂ (AHC 3288–3289), opposite Orabes Wall, Brandberg [21°13'S 14°38'E], 1.ii.1981, A. Harington; 3 ♂♂ (AHC 2034–2036), Uis [21°15'S 14°50'E], iii–iv.1981, J. Botha; 2 ♂♂ (AHC 2130–2131), Uis River, near Kai-Nuses, near Uis [21°11'S 14°52'E], 2.ii.1981, A. Harington; 3 ♀♀ (AHC 2141–2142, 2233), Uis tin mine, Uis [21°13'S 14°51'E], vii.1981, J. Botha; Kunene Region, Khorixas Distr., 2 ♂♂ (AHC 1512, 1514), ♀ (AHC 1513), Gai-As fountain, NW of Brandberg [20°46'S 14°02'E], 9–11.iv.1980, R. Wharton & W.D. Haacke; ♂ (AHC 2129), 2 ♀♀ (AHC 3314–3315), same data, except '29.i.1981, A. Harington'; ♀ (AHC 3149), 10 km NE of Gai-As fountain, NW of Brandberg [20°44'S 14°05'E], 21.vi.1982, P. Erb.

DESCRIPTION: The following account supplements Hewitt's (1934: 408–410) original description of the ♂ *O. undulatus ugabensis* and Lawrence's (1969: 115) notes on *O. cavimanus ugabensis*. The ♀ of this species has not been thoroughly described and a description of relevant character states is provided here. Detailed measurements are presented in Table 2.

Colour: Carapace, chelicerae, pedipalpal femora, Dark Brownish Olive No. 129. Pedipalpal chelae and patellae, Sepia No. 219. Tergites, sternites and metasomal segments I–V, Blackish Neutral Grey No. 82. Telson, Sepia No. 219. Dorsal surface leg femora and patellae, Dark Brownish Olive No. 129, tibiae and tarsi, Olive Brown No. 28. Ventral surface leg femora, patellae, tibiae and tarsi, Olive Brown No. 28. Pectines, Tawny Olive No. 223D.

Carapace: Median ocelli slightly larger than lateral ocelli. Median ocelli situated postero-medially (Figure 7), with ratio of distance from anterior carapace margin to carapace length 0.54. Ocular tubercle with superciliary ridges well developed, protruding above median ocelli, and interocular furrow distinct. Anterior margin of carapace with median notch, but without anterior median depression. Median longitudinal furrow suturiform, with weakly developed to obsolete anterior furcation, and distinct antero-ocular depression. Median longitudinal suture continuous from ocular tubercle to median notch, where a short, V-shaped anterior furcation is usually evident, but may be obsolete. Posterior sutures with an X configuration, converging on ocular tubercle from posterior carapace margin, then diverging just posterior to ocular tubercle, where they are usually connected by means of a small cross-suture, and extending anteriorly for a short distance beyond ocular tubercle. Carapace entirely granular, except for medial portions of interocular surface, which are smooth (♂); carapace with interocular surface almost completely smooth, except for weak granulation on frontal lobes, and postero-



Figures 1–7. *Opisththalmus lamorali* sp. nov., diagnostic characters. 1. Paratype ♂ (AMGS). 2–7. Paratype ♀ (AMGS). 1–6. Distribution of trichobothria on the dextral pedipalpal segments. 1–2, dorsal aspect of chela; 3, ventral aspect of chela; 4, dorsal aspect of patella; 5, external aspect of patella; 6, ventral aspect of patella. 7. Dorsal aspect of carapace, showing sutures and position of ocelli. Scale bars = 20 mm.

median surface smooth (♀). Granulation almost uniform, coarsest on anterolateral surfaces and finest on posterolateral surfaces.

Chelicerae: Cheliceral coxae with 3–4 chemoreceptive setae (trichopae) on internommedian surfaces and numerous basally flattened stridulatory setae (scaphotrix) on dorsointernal surfaces.

Pedipalps: Chela length along ventroexternal carina greater than chela width and chela height. Chela dorsal surface smooth; external intercarinal surfaces almost smooth, with a few scattered granules; internal surfaces with scattered granules. Chela dorsomedian carina comprising an irregular row of granules; dorsal secondary carinae and subdigital carinae obsolete; digital carina distinct, costate along entire length; externommedian carina weakly developed, granular, becoming obsolete in some specimens; ventroexternal and ventromedian carinae distinct, costate along entire length; ventrointernal and internommedian carinae each comprising a weakly developed row of granules, internommedian carina becoming obsolete in some specimens. Patella dorsal surface and external intercarinal surfaces smooth. Patella with distinct anterior process. Patella dorsointernal carina distinct, granular; dorsomedian carina distinct, granular to costate granular; dorsoexternal carina distinct, granular (♂) or costate granular to costate (♀); externommedian carina distinct, granular; ventroexternal carina distinct, costate granular to costate.

Trichobothria: Neobothriotaxic major, type C (Figures 1–6), with the following segment totals: femur 3, patella 20 (14 on external surface) and chela 26. Total number of trichobothria per pedipalp, 49. Patella with d_2 distinctly closer to i than to d_1 .

Legs: Retrolateral margins of basitarsi I–III each with a longitudinal row of two (III) or three (I–II) spiniform macrosetae, in addition to numer-

ous scattered macrosetae; retrolateral margins of tibia I–II each with one or two spiniform macrosetae. Telotarsi each with two ventrosbmedian rows of spiniform macrosetae (7–8 setae in pro-lateral row, 10–12 setae in retrolateral row) and numerous scattered microsetae ventrally. Telotarsal median dorsal lobes much shorter than lateral lobes, each terminating in a single macroseta. Telo-tarsal ungues short, distinctly curved and of equal length.

Mesosoma: Tergites with very fine and even granulation, imparting a matt appearance (♂); smooth and shiny (♀). Sternites IV–VII with numerous fine transverse undulations/corrugations (♂); smooth (♀). Sternite VII without ventrosbmedian or ventrolateral carinae.

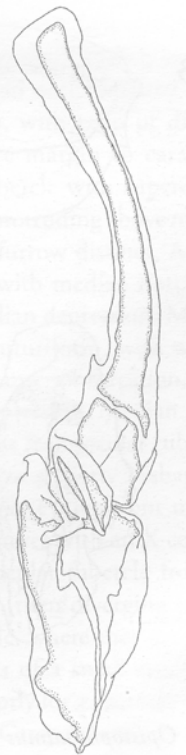
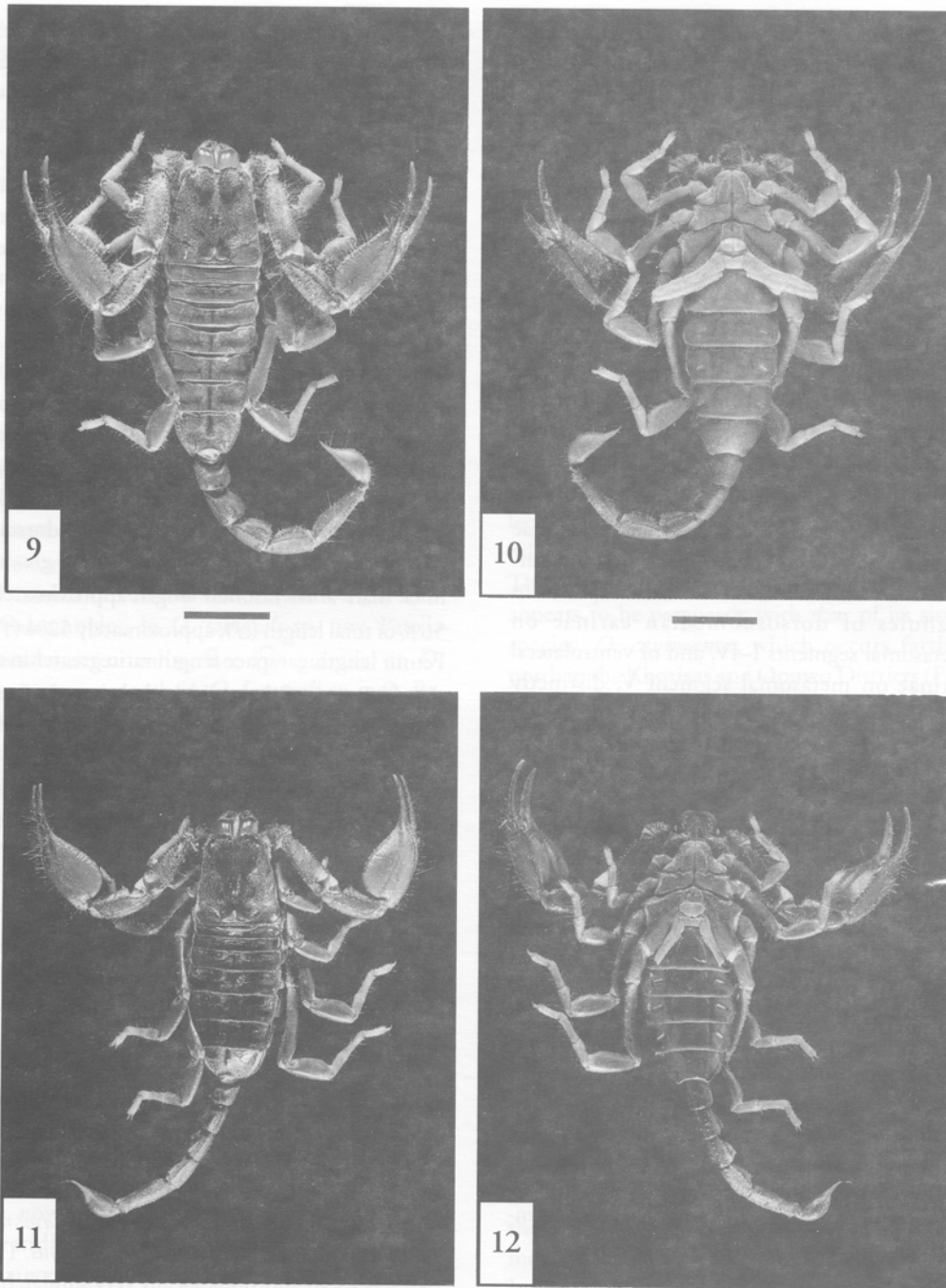


Figure 8. *Opisththalmus lamorali* sp. nov. (Paratype ♂, NMNW 1896), dextral hemispermaphore. Scale bar = 1 mm.



Figures 9–12. *Opisththalmus lamorali* sp. nov., habitus (dorsal and ventral aspects). 9–10. Paratype ♂ (AMGS). 11–12. Paratype ♀ (NMNW 1896). Scale bars = 10 mm.

Metasoma and telson: Dorsal surface of metasomal segment I, and occasionally II (♂), granular; segments III–V and telson smooth. Ventral surfaces of metasomal segments I–III with numerous fine transverse undulations/corrugations (♂); smooth (♀). Ventral surface of segment IV smooth (♀) or slightly granular (♂); segment V markedly granular; telson smooth. Metasomal segments I–IV with dorsosubmedian and dorsolateral carinae distinct, granular; segment V without dorsosubmedian carinae, with dorsolateral carinae obsolete. Metasomal segments I–III without ventrosubmedian or ventrolateral carinae; segment IV with ventrosubmedian carinae absent or obsolete, granular, and ventrolateral carinae obsolete, costate; segment V with ventromedian and ventrolateral carinae distinct, granular; segment V anal arch with anterior carina obsolete, costate. Distal spiniform granules of dorsosubmedian carinae on metasomal segments I–IV, and of ventrolateral carinae on metasomal segment V, distinctly larger than subdistal granules. Segment V with ventral surface convex in lateral profile and ventrolateral carinae diverging distally. Telson elongate.

Pectines: First proximal median lamella of each pecten with mesial margin angular, pectinal teeth present along entire posterior margin (♂); first proximal median lamella with mesial margin shallowly curved, proximal third of posterior margin devoid of teeth (♀). Pectinal teeth: 25–27/25–28 (♂); 15–16/16–17 (♀).

Genital operculum: suboval (♂); subcordate (♀).

Hemispermatothore: Distal lamina with hook notch situated proximally and distal crest truncate (Figure 8).

Geographic variation: Little variation aside from overall colouration, which is much lighter in specimens from the northwest of the distribu-

tional range, as follows. Carapace and pedipalps, Clay Color No. 26. Tergites, Sepia No. 219. Legs, pectines, sternites and metasoma, Tawny Olive No. 223D.

Ontogenetic variation: As in other species of *Opisththalmus*, ♂ resembles ♀ very closely until the final instar. Juveniles and subadults can, however, be readily sexed by examination of the pectines and genital aperture.

Sexual dimorphism: In addition to abovementioned characters, adult ♂ and ♀ differ in the following respects (Figures 9–12). Although ♂ and ♀ differ little in overall length, ♂ is proportionally more slender, with pedipalps distinctly longer, narrower and more compressed dorsoventrally. Sternite VII length:width ratio greater in ♂ than ♀. Metasomal length approximately 56% of total length (♂); approximately 52% (♀). Femur length:carapace length ratio greater in ♂ than ♀. Ratios of chela width:chela length along ventroexternal carina and chela height:chela length along ventroexternal carina, greater in ♀ than ♂. Ratio of movable finger length:chela length along ventroexternal carina, greater in ♂ than ♀.

ETYMOLOGY: This new Namibian species is named after Dr. Bruno H. Lamoral in honour of his contribution to the systematics of southern African, and particularly Namibian, scorpions.

DIAGNOSIS: The results of a preliminary cladistic analysis for the species of *Opisththalmus*, based on a simultaneous analysis of morphological and DNA sequence data (L. Prendini in prep.), indicate that *O. lamoralis* sp. nov. is the sister species of *O. cavimanus*. The two species are morphologically very similar, but are distinguished by the following character states. Position of median ocelli: medial in *O. cavimanus*; posteromedial in *O. lamoralis* sp. nov.

Carapace anterior furcated suture: short and almost U-shaped in *O. cavimanus*; longer and distinctly V-shaped in *O. lamoralis* sp. nov. Carapace interocular surface (♂): entirely granular in *O. cavimanus*; granular anteriorly and along median longitudinal furrow, with smooth areas medially, in *O. lamoralis* sp. nov. Carapace interocular surface (♀): granular anteriorly and along median longitudinal furrow, with smooth areas medially, in *O. cavimanus*; slightly granular anteriorly, with smooth areas medially, to entirely smooth, in *O. lamoralis* sp. nov. Chela ventrointernal and internomedian carinae (♂): usually obsolete in *O. cavimanus*; weakly developed, granular in *O. lamoralis* sp. nov. Chela dorsal surface (♀): reticulated in *O. cavimanus*; smooth in *O. lamoralis* sp. nov. Chela exterior intercarinal surfaces (♀): markedly granular in *O. cavimanus*; almost smooth, with a few scattered granules, in *O. lamoralis* sp. nov. Patella dorsal intercarinal surface (♀): granular in *O. cavimanus*; smooth in *O. lamoralis* sp. nov. Patella dorsoexternal carina: weakly developed, granular in *O. cavimanus*; strongly developed, costate in *O. lamoralis* sp. nov. Surfaces of sternites IV–VII and ventral surfaces of metasomal segments I–III (♂): with coarse transverse undulations (corrugations) in *O. cavimanus*; with transverse undulations (corrugations) more finely divided in *O. lamoralis* sp. nov. Ventrolateral carinae of metasomal segment V (♂): subparallel in *O. cavimanus*; diverging in *O. lamoralis* sp. nov. Distal spiniform granules of dorsosubmedian carinae on metasomal segments I–IV, and of ventrolateral carinae on metasomal segment V: weakly developed in *O. cavimanus*; strongly developed in *O. lamoralis* sp. nov. In addition, most specimens of *O. lamoralis* sp. nov., especially to the south and east of the Brandberg, can be distinguished from *O. cavimanus*, which is usually orange yellow to reddish-brown in colour, by their dark brownish-olive to blackish-grey colouration. Meristic

differences between *O. cavimanus* and *O. lamoralis* sp. nov. are reflected in Table 2.

DISTRIBUTION: *Opisthophthalmus lamoralis* sp. nov. is endemic to the Omaruru and Khorixas Districts of northwestern Namibia (Figure 13 & 14). All available material originates from an area between Uis, southeast of the Brandberg, and the Huab River, to the northwest. Besides specimens collected in the Amis and Numas gorges (AHC, NMNW) which intersect the western perimeter of the Brandberg, *O. lamoralis* sp. nov. has not been collected from the mountain massif itself, suggesting that it is restricted to the surrounding low altitudes. At the remaining localities where *O. lamoralis* sp. nov. was collected personally, it was found only on the small hills and rocky flats surrounding the Brandberg. The distributional range of *O. lamoralis* sp. nov. appears to be parapatric with that of its sister species, *O. cavimanus*, which occurs farther north in the Khorixas and Opuwo Districts (Figure 13).

ECOLOGY: Eastwood (1978) suggested that elongation of the pedipalp chelae and overall dorsoventral compression were lithophilous adaptations in species of *Opisthophthalmus* that construct shallow burrows or scrapes under stones. As with *O. cavimanus*, *O. lamoralis* sp. nov. is restricted to rocky areas in regions of rugged, mountainous topography, where it constructs shallow burrows under stones in fairly hard loam soils. Adult ♂♂ are commonly found sheltering in temporary scrapes under loose stones. The burrows of *O. lamoralis* sp. nov. are shallower (usually less than 10 cm in depth) than those of *O. cavimanus* and the burrow entrances are usually situated at the side of stones. In contrast, the burrow entrances of *O. cavimanus* are commonly situated in open ground (Lamoral 1979; L. Prendini pers. obs.). The habitat and habitus of *O. lamoralis* sp. nov. indicate that it is a lithophilous burrowing scorpion, as is *O. cavimanus*.

Table 2. Meristic data for ♂♂ and ♀♀ paratypes of *Opisthophthalmus lamorali* sp. nov., from Uis (Erongo Region, Omaruru District) and a ♂ and ♀ *Opisthophthalmus cavimanus* Lawrence, from Palm (Kunene Region, Khorixas District), included for comparison. Measurements following Stahnke (1970) and Lamoral (1979). ¹Sum of carapace, tergites I–VII, metasomal segments I–V, and telson; ²sum of tergites I–VII; ³sum of metasomal segments I–V and telson; ⁴measured from base of condyle to tip of fixed finger.

| Specimen | sex | collection | <i>O. cavimanus</i> Lawrence | | <i>O. lamorali</i> sp. nov. | | | |
|---------------------------|----------------------------------|------------------|------------------------------|-----------|-----------------------------|-----------|-----------|-----------|
| | | | ♂ AMNH | ♀ AMNH | ♂ AMGS | ♂ AMNH | ♀ AMNH | ♀ AMNH |
| Total length ¹ | | | 73.25 | 75.29 | 67.3 | 84.22 | 65.30 | 77.05 |
| Carapace | length | | 11.42 | 12.18 | 11.52 | 13.44 | 11.48 | 12.94 |
| | anterior width | | 7.28 | 7.51 | 6.85 | 8.35 | 7.08 | 8.16 |
| | posterior width | | 9.79 | 10.72 | 10.13 | 12.73 | 10.61 | 12.69 |
| | median ocelli to anterior margin | | 6.02 | 6.28 | 6.20 | 7.60 | 6.15 | 7.27 |
| Mesosoma | total length ² | | 21.83 | 24.74 | 22.15 | 24.25 | 23.84 | 25.55 |
| Sternite VII | length | | 5.05 | 5.43 | 5.53 | 6.09 | 5.70 | 5.81 |
| | width | | 7.02 | 7.71 | 7.74 | 8.54 | 8.88 | 10.93 |
| Metasoma | total length ³ | | 40.00 | 38.37 | 38.30 | 46.53 | 34.38 | 38.56 |
| Metasoma I | length | | 4.47 | 4.29 | 4.52 | 5.63 | 4.11 | 4.53 |
| | width | | 4.05 | 3.69 | 4.43 | 4.79 | 3.72 | 4.79 |
| Metasoma II | length | | 5.25 | 4.81 | 4.97 | 6.02 | 4.25 | 5.01 |
| | width | | 3.58 | 3.56 | 3.51 | 4.29 | 3.24 | 4.12 |
| Metasoma III | length | | 5.47 | 5.13 | 5.19 | 6.46 | 4.43 | 5.13 |
| | width | | 3.47 | 3.31 | 3.46 | 4.01 | 3.07 | 3.73 |
| Metasoma IV | length | | 6.22 | 5.65 | 6.05 | 7.26 | 5.18 | 5.75 |
| | width | | 2.96 | 2.94 | 3.08 | 3.56 | 2.45 | 3.27 |
| Metasoma V | length | | 9.04 | 9.03 | 8.74 | 10.37 | 7.89 | 8.66 |
| | width | | 2.89 | 2.75 | 2.97 | 3.44 | 2.80 | 3.20 |
| Telson | total length | | 9.55 | 9.46 | 8.83 | 10.79 | 8.52 | 9.48 |
| | aculeus length | | 3.89 | 3.94 | 3.16 | 4.27 | 3.33 | 3.96 |
| | vesicle length | | 5.70 | 5.48 | 5.66 | 6.56 | 5.21 | 5.47 |
| | vesicle width | | 3.39 | 3.27 | 3.08 | 4.01 | 2.82 | 3.43 |
| | vesicle height | | 2.48 | 2.69 | 2.48 | 3.06 | 2.24 | 2.64 |
| Femur | length | | 10.06 | 9.37 | 9.77 | 11.83 | 8.56 | 10.10 |
| | width | | 3.03 | 3.21 | 3.65 | 3.68 | 3.28 | 3.56 |
| Patella | length | | 9.55 | 8.57 | 9.23 | 11.07 | 8.37 | 8.83 |
| | width | | 4.00 | 4.01 | 4.27 | 4.88 | 3.67 | 4.52 |
| Chela | length ⁴ | | 18.22 | 17.19 | 16.63 | 20.72 | 15.79 | 17.62 |
| | width | | 4.94 | 6.24 | 5.00 | 5.02 | 6.14 | 6.31 |
| | height | | 5.19 | 7.28 | 4.57 | 5.70 | 5.16 | 7.52 |
| | length of ventroexternal carina | | 8.33 | 8.52 | 7.76 | 9.93 | 7.99 | 9.04 |
| | length of movable finger | | 12.33 | 11.01 | 10.7 | 13.53 | 9.36 | 10.72 |
| Pectines | total length | | 8.87 | 6.34 | 9.37 | 10.69 | 6.06 | 7.67 |
| | length to dentate margin | | 8.45 | 4.34 | 8.97 | 10.65 | 4.08 | 5.49 |
| | tooth count | row (left/right) | 23/24 | 16/16 | 27/28 | 25/28 | 16/17 | 17/17 |
| Telotarsi I | prolateral | row (left/right) | 8/7 | 6/6 | 7/7 | 7/7 | 7/7 | 7/7 |
| | retrolateral | row (left/right) | 10/10 | 11/10 | 11/11 | 10/10 | 10/10 | 11/10 |
| Telotarsi II | prolateral | row (left/right) | 8/6 | 7/7 | 7/7 | 7/7 | 7/7 | 7/7 |
| | retrolateral | row (left/right) | 10/11 | 10/11 | 12/11 | 11/11 | 11/10 | 11/11 |
| Telotarsi III | prolateral | row (left/right) | 7/7 | 7/7 | 8/7 | 7/7 | 7/7 | 7/7 |
| | retrolateral | row (left/right) | 11/11 | 10/10 | 11/11 | 11/11 | 11/11 | 11/11 |
| Telotarsi IV | prolateral | row (left/right) | 7/7 | 7/7 | 7/8 | 8/8 | 8/8 | 8/8 |
| | retrolateral | row (left/right) | 10/11 | 10/10 | 12/12 | 11/11 | 11/11 | 12/12 |

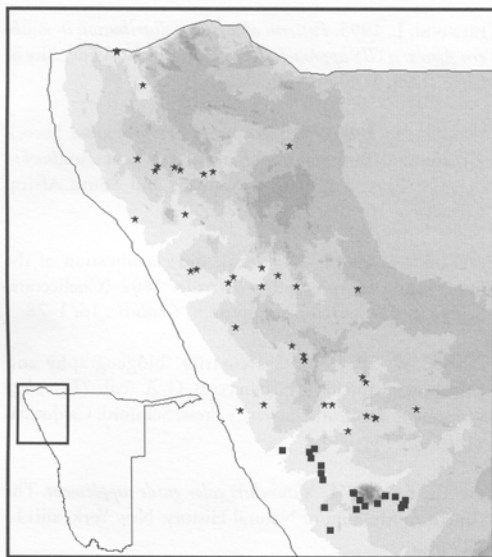


Figure 13. The distributions of *Opisthophthalmus cavimanus* Lawrence (stars) and *Opisthophthalmus lamorali* sp. nov. (squares) in northwestern Namibia (contour interval 600 m.). Data for *O. cavimanus* compiled from Prendini (1995).

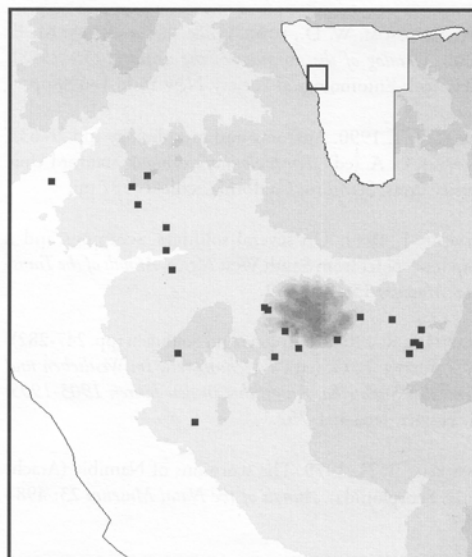


Figure 14. The distribution of *Opisthophthalmus lamorali* sp. nov. (squares) in the Brandberg area (contour interval 600 m.).

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