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## A new species of *Sphaerowithius* (Pseudoscorpiones, Withiidae) from Namibia

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### ABSTRACT

A new species of *Sphaerowithius* Mahnert, 1988, *S. ansieae* sp. n., is described from specimens collected in caves in northern Namibia. The specimens show some slight modifications to an obligate cavernicolous existence including small eyes and long, slender pedipalps.

KEY WORDS: Afrotropical Region, taxonomy, morphology, caves.

### INTRODUCTION

The pseudoscorpion family Withiidae is well represented in the Afrotropical zone, with representatives of 24 genera recorded (Harvey 2013). One of these genera, *Sphaerowithius* Mahnert, 1988, was proposed to accommodate several species from Africa and the Solomon Islands (Mahnert 1988), which had been previously included in *Nannowithius* Beier, 1932.

While examining specimens of Withiidae in some European museums, we found several specimens of *Sphaerowithius* collected from two caves in northern Namibia by Pierre Strinati and his colleagues in 1970, during a survey of the caves of the Otavi region (Strinati 1977). These specimens were clearly different from all other named species of the genus, and form the basis for the present study. The specimens have had an interesting nomenclatural history. They were initially identified as “*Nannowithius transvaalensis* (Beier)” by Prof. M. Beier (Naturhistorisches Museum, Vienna), and this identification was used by Strinati (1977). In the meantime, Mahnert (1975) illustrated the female genitalia of one of these specimens and used the name *Xenowithius transvaalensis* Beier, which was the original generic combination. Mahnert (1988) later suggested that they represented a species of *Sphaerowithius*. While the specimens from Namibia clearly resemble other species of *Sphaerowithius*, they are substantially larger and clearly represent a previously undescribed species, which is named and described in this paper.

### MATERIAL AND METHODS

The material used for this study is lodged in the Muséum d'histoire naturelle de la Ville de Genève (MHNG). The specimens were stored in ethanol and were examined using temporary slide mounts prepared by immersing the specimens in 75% lactic acid

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at room temperature for several days, and temporarily mounting them on microscope slides with 10 mm coverslips supported by small sections of 0.25 mm diameter nylon fishing line. Specimens were observed with Olympus BH-2 or Leica DM2500 compound microscopes and illustrated with the aid of a drawing tube. Measurements were taken at the highest possible magnification using an ocular graticule. After study the specimens were rinsed in water and then returned to 75 % ethanol with the dissected portions placed in 12×3 mm glass genitalia microvials (BioQuip Products, Inc.).

Terminology and mensuration mostly follow Chamberlin (1931), with the exception of the nomenclature of the pedipalps and legs, and with some minor modifications to the terminology of the trichobothria (Harvey 1992), cheliceral setation (Harvey & Edward 2007), cheliceral rallum (Judson 2007) and faces of the appendages (Harvey *et al.* 2012). The ratio TS is the distance from the base of tarsus IV to the tactile seta, divided by the length of the entire tarsus. The abbreviation *gls* refers to the abdominal glandular setae found on the sternites of many withiids.

#### TAXONOMY

Family Withiidae Chamberlin, 1931

Genus *Sphaerowithius* Mahnert, 1988

*Sphaerowithius* Mahnert 1988: 68–69.

Type species: *Chelifer (Trachychernes) perpusillus* Ellingsen, 1910, by original designation.

Diagnosis: *Sphaerowithius* differs from other withiid genera by the paired, rounded spermathecae.

Remarks: The genus *Sphaerowithius* is represented by five named species: *S. basilewskyi* (Beier, 1962) from Tanzania (Beier 1962), *S. perpusillus* (Ellingsen, 1910) from Kenya (Ellingsen 1910), *S. saegeri* (Beier, 1972) from the Democratic Republic of the Congo (Beier 1972), *S. vaffer* (Beier, 1966) from South Africa (Beier 1966a), and *S. salomonensis* (Beier, 1966) from the Solomon Islands (Beier 1966b). The latter species was only doubtfully included in the genus (Mahnert 1988). All of these species had been included in the genus *Nannowithius* Beier, 1932 until Mahnert (1988) demonstrated fundamental differences between this group of species and typical *Nannowithius*, which was found to be a senior synonym of *Myrmecowithius* Beier, 1963.

#### *Sphaerowithius ansieae* sp. n.

Figs 1, 2

*Xenowithius transvaalensis* Beier, 1953: Mahnert 1975: fig. 6b (misidentification).

*Nannowithius transvaalensis* (Beier, 1953): Strinati 1977: 104 (misidentification).

Etymology: This species is named for our friend Ansie Dippenaar-Schoeman for her outstanding contributions to arachnology.

Diagnosis: *Sphaerowithius ansieae* sp. n. differs from all other species of the genus in being substantially larger, e.g. the pedipalpal femur length is 0.99–1.05 mm (males) and 1.00–1.09 mm (females), whereas in *S. vaffer* it is 0.58 mm (male) and 0.62 mm (female), in *S. basilewskyi* it is 0.66 mm (male) and 0.71 mm (female), in *S. perpusillus* it is 0.38–0.43 mm (female), in *S. saegeri* it is 0.55–0.61 mm (female) and in *S. salomonensis* it is 0.42 mm (male).

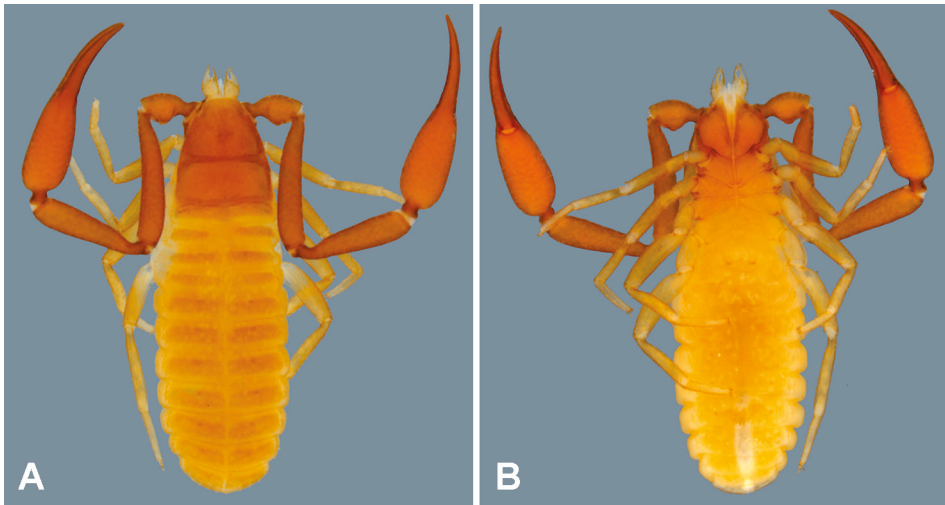


Fig. 1. *Sphaerowithius ansieae* sp. n., holotype male: (A) dorsal; (B) ventral.

#### Description:

##### Adults:

**Colour.** Pedipalps and carapace red-brown, tergites slightly paler, remainder of sclerotised portions pale yellow-brown (Fig. 1).

**Chelicera.** With 5 setae on hand, *bs* and *sbs* slightly dentate; movable finger with 1 subdistal seta; galea of ♂ and ♀ with 4 small terminal and 2 small medial rami; rallum of 4 blades, the most distal blade with several serrations on leading edge, other blades smooth; serrula exterior with 17 (♂, ♀) blades; lamina exterior present.

**Pedipalp** (Fig. 2D). Trochanter, femur, patella and chelal hand coarsely granulate, chelal fingers smooth; setae generally clavate and denticulate; segments long and slender, trochanter 1.41–1.43 (♂), 1.96–2.05 (♀), femur 5.60–5.68 (♂), 5.46–5.60 (♀), patella 4.66–4.98 (♂), 4.20–4.62 (♀), chela (with pedicel) 4.82–5.09 (♂), 4.44–4.61 (♀), chela (without pedicel) 4.52–4.78 (♂), 4.15–4.34 (♀), hand 2.35–2.45 (♂), 2.11–2.19 (♀) × longer than broad, movable finger 0.97–1.00 (♂), 0.96–0.99 (♀) × longer than hand (without pedicel). Fixed chelal finger with 8 trichobothria, movable chelal finger with 4 trichobothria (Fig. 2A): *eb* and *esb* situated basally; *est* situated sub-medially, opposite *isb*; *et* situated sub-distally; *ib* and *ist* situated basally; *isb* situated medially; *it* situated sub-distally; *b* and *sb* situated near one another; *st* substantially closer to *t* than to *sb*. Venom apparatus present in both chelal fingers, venom ducts long, terminating in nodus ramosus between *et* and *est* in fixed finger and distal to *t* in movable finger. Retrolateral side of fixed finger with 11 sense-spots; retrolateral side of movable finger with 15 sense-spots; prolateral sides without sense-spots. Chelal teeth very small; fixed finger with 59 (♂), 58 (♀) teeth; movable finger with 65 (♂), 55 (♀) teeth; accessory teeth absent.

**Carapace** (Fig. 2C). 1.22–1.28 (♂), 1.17–1.26 (♀) × longer than broad; posteriorly widened; with 2 very small non-corneate eye-spots; with 70 (♂), 61 (♀) setae, including

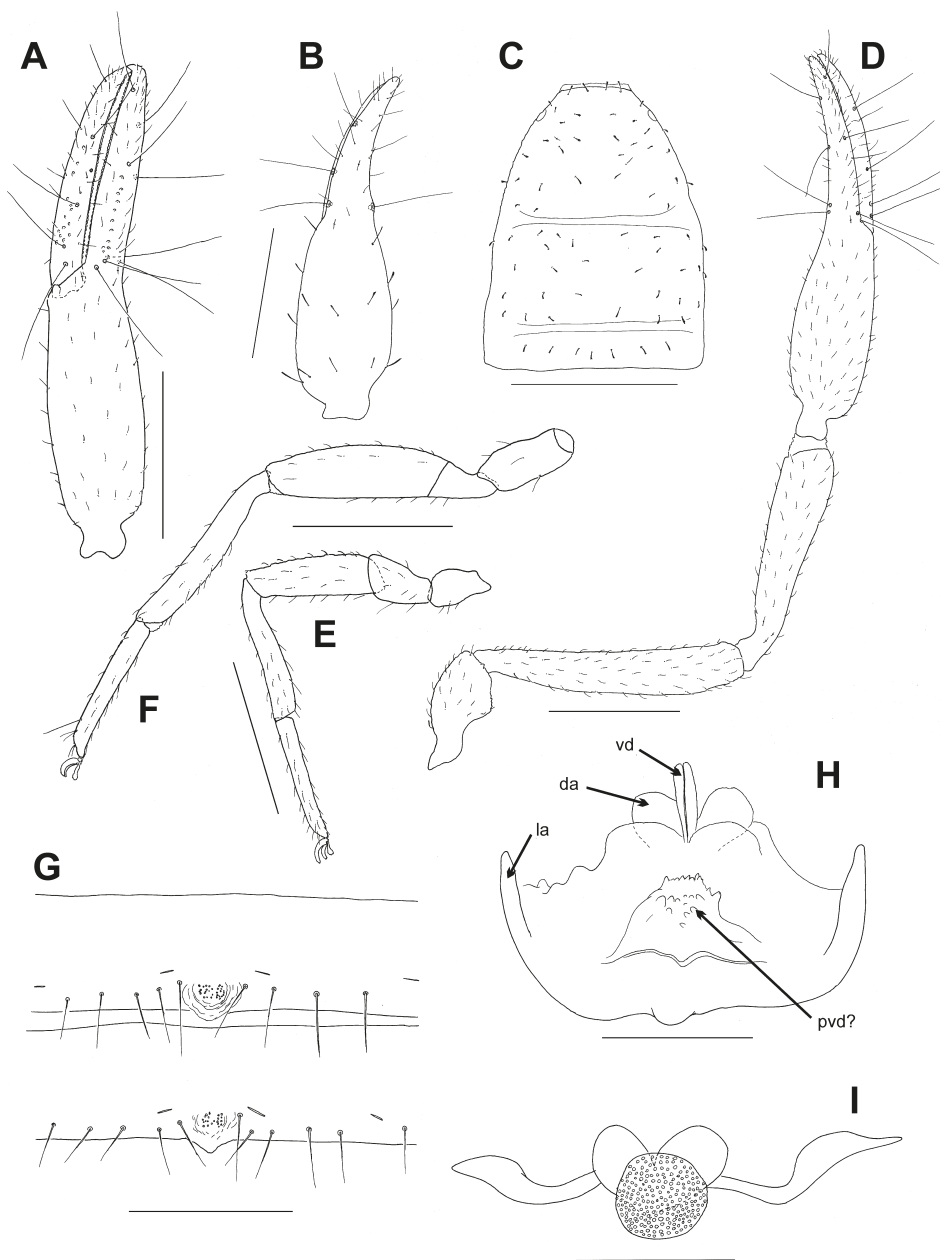


Fig. 2. *Sphaerowithius ansieae* sp. n., holotype male, unless stated otherwise: (A) left chela, lateral; (B) left chela, dorsal, protonymph paratype; (C) carapace, dorsal; (D) right pedipalp, dorsal; (E) leg I; (F) leg IV; (G) sternites VIII and IX, ventral; (H) genitalia, ventral; (I) genitalia, ventral, female paratype. Abbreviations: da, dorsal apodeme; la, lateral apodemes; pvd, postero-ventral diverticulum; vd, ventral diverticulum. Scale bars: (A, C–F)=0.5 mm, (B, G)=0.2 mm, (H, I)=0.1 mm.

31 (♂), 27 (♀) in anterior zone (with 4 near anterior margin), 32 (♂), 28 (♀) in median zone, and 7 (♂), 6 (♀) in posterior zone; with 2 deeply incised furrows, posterior furrow closer to posterior margin than to median furrow.

*Coxal region.* Maxilla with 2 apical setae and 1 very small internal, sub-oral seta, plus 20 (♂), 25 (♀) other setae; maxilla without rugose area; chaetotaxy of coxae I–IV: ♂, 10: 10: 14: 23, ♀, 8: 9: 10: 20.

*Legs* (Figs 2E, F). Long and slender; junction between femora and patellae I and II only slightly oblique; femur + patella of leg IV 4.25 (♂), 4.56 (♀) × longer than broad; legs III and IV with slightly shortened, acuminate, tarsal tactile seta, situated sub-distally, TS = 0.78 (♂), 0.75 (♀); subterminal tarsal setae simple, arcuate and acute; arolium slightly shorter than claws.

*Abdomen.* Tergites I–X and sternites VI–VIII with faint medial suture. Tergal chaetotaxy: ♂, 6: 8: 9: 12: 11: 13: 16: 16: 15: 16: 10 (including 2 tactile setae): 2; ♀, 6: 6: 9: 10: 10: 12: 13: 14: 14: 14: 8: 2; mostly uniseriate, but some tergites with a few setae placed anteriorly; all setae foliate. Sternal chaetotaxy: ♂, 8: (2) 11 (2): (1) 12 [0] (1): 18: 16: 16: 15 + ca. 26 gls: 14 + ca. 20 gls: 12: 7 (including 2 tactile setae): 2; ♀, 14: (2) 9 (2): (1) 6 (1): 16: 15: 13: 12: 12: 10: 6 (including 2 tactile setae): 2; ♂ without internal setae in the genital atrium; sternites VIII–IX of ♂ with small patches of glandular setae (Fig. 2G), set in a depression that extends posteriorly over the segmental membrane, glandular setae small and conical; sternites of ♀ without glandular setae; all other setae uniseriate and acuminate; ♂ without paired invaginations on anterior margins of sternites.

*Genitalia.* Male with rounded dorsal apodemes, lateral apodemes not elongated, postero-ventral diverticulum (?) with small lobes (Fig. 2H); female with 2 spheroid spermathecal receptacula, with 1 ovoid median cribriform plate and a pair of curved lateral apodemes (Fig. 2I).

*Male dimensions (mm).* Holotype, followed by other male paratype (when measured): Body length 2.38 (2.43). Pedipalps: trochanter 0.468/0.242 (0.435/0.228), femur 1.045/0.184 (0.992/0.184), patella 0.899/0.193 (0.877/0.176), chela (with pedicel) 1.486/0.308 (1.424/0.280), chela (without pedicel) 1.392 (1.338), hand length 0.725 (0.685), movable finger length 0.704 (0.686). Chelicera 0.242/0.106, movable finger length 0.173. Carapace 0.888/0.693 (0.851/0.698); eye diameter 0.039. Leg I: femur 0.200/0.140, patella 0.378/0.130, tibia 0.452/0.079, tarsus 0.410/0.058. Leg IV: femur + patella 0.722/0.170, tibia 0.630/0.090, tarsus 0.463/0.068, TS length 0.360.

*Female dimensions (mm).* Paratype, followed by other paratype females (when measured): Body length 2.38 (2.51–3.22). Pedipalps: trochanter 0.435/0.218 (0.448–0.481/0.219–0.246), femur 0.996/0.178 (1.005–1.091/0.184–0.198), patella 0.947/0.205 (0.886–0.982/0.211–0.231), chela (with pedicel) 1.446/0.314 (1.488–1.586/0.328–0.357), chela (without pedicel) 1.363 (1.405–1.482), hand length 0.688 (0.694–0.770), movable finger length 0.668 (0.685–0.736). Chelicera 0.255/0.110, movable finger length 0.177. Carapace 0.848/0.688 (0.880–0.904/0.718–0.752); eye diameter 0.026. Leg I: femur 0.187/0.125, patella 0.403/0.074, tibia 0.414/0.073, tarsus 0.389/0.057. Leg IV: femur + patella 0.725/0.159, tibia 0.640/0.088, tarsus 0.481/0.067, TS length 0.360.

*Protonymph:*

*Colour.* Mostly very pale yellow-brown, with pedipalps and carapace pale red-brown.

*Chelicera*. With 4 setae on hand and no seta on movable finger; rallum with 4 blades. *Pedipalp*. Trochanter 1.78, femur 2.97, patella 2.37, chela (with pedicel) 3.60, chela (without pedicel) 3.42, hand  $1.76 \times$  longer than broad, movable finger  $0.96 \times$  longer than hand (without pedicel). Fixed chelal finger with 3 trichobothria, movable chelal finger with 1 trichobothrium (Fig. 2B): only *eb*, *et*, *ist* and *t* present.

*Carapace*.  $1.30 \times$  longer than broad; eyes absent; with 16 setae, including 4 near anterior margin and 4 near posterior margin; with 1 deep, median furrow.

*Abdomen*. Tergal chaetotaxy: 2: 2: 4: 4: 4: 4: 4: 4: 2: 2. Sternal chaetotaxy: 0: (0) 2 (0): (1) 2 (1): 4: 4: 4: 4: 4: 4: 2; glandular setae absent.

*Dimensions (mm)*. Body length 1.24. Pedipalps: trochanter 0.173/0.097, femur 0.288/0.097, patella 0.258/0.109, chela (with pedicel) 0.525/0.146, chela (without pedicel) 0.499, hand length 0.257, movable finger length 0.248. Carapace 0.506/0.390.

Holotype: NAMIBIA: *Otjozondjupa*: ♂ Nosibhöhle, Otavi ( $19^{\circ}39'S$   $17^{\circ}20'E$ ), 2.v.1972, P. von Wrede & P. Strinati (MHNG).

Paratypes: NAMIBIA: *Otjozondjupa*: 3♀, 1 protonymph, collected with holotype (MHNG); 1♂ Albathöhle, Otavi ( $19^{\circ}39'S$   $17^{\circ}20'E$ ), 30.iv.1972, P. von Wrede & P. Strinati (MHNG).

Remarks: *Sphaerowithius ansieae* sp. n. is known only from two caves in the Otavi region of northern Namibia, from Nosibhöhle and Albathöhle, and the specimens were first recorded by Strinati (1977). He also mentioned a specimen from nearby Ghaubhöhle, but this specimen has not been available for study. These three caves, along with Aigamashöhle, were described by Strinati (1977), who also listed other taxa collected in the caves including beetles, hemipterans, orthopterans, flies, isopods, spiders, mites, harvestmen, earthworms, and molluscs, as well as the pseudoscorpion *Cheiridium capense* Beier, 1970, which was previously known only from the type locality in South Africa (Beier 1970). The specimens of *S. ansieae* show some slight modifications to an obligate cavernicolous existence including extremely small eyes and long, slender pedipalps.

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