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Termitowithius kistneri, a new genus and species of termitophilous pseudoscorpion from Tanzania (Pseudoscorpionida: Withiidae)

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Summary

Termitowithius kistneri, n. gen. and sp. was found in a termite nest in Tanzania. It is modified apparently for life in its special habitat and males differ from most withiid males in the absence of small sensory setae from abdominal sternites.

Introduction

Incidental to his studies of termites in East Africa, David H. Kistner of the California State University, Chico, collected a number of pseudoscorpions from the termites' nests. Among these are 11 specimens of special interest because of their odd-shaped, elongate palps. They bear considerable superficial resemblance to *Reischekia coracoides* Beier, 1948 from New Zealand, but turn out to belong to the family Withiidae rather than the Chernetidae. They are sufficiently different from other withiids to deserve generic rank.

Termitowithius, new genus

Type species: Termitowithius kistneri, new species.

Etymology: The genus is named in reference to its living in termite nests and to its presumed withiid affinities.

Diagnosis: With some characters of the family Withiidae, namely, all legs monotarsate, venom apparatus equally developed in the 2 chelal fingers, 4 setae in the cheliceral flagellum, male genitalia complex but without ramshorn organs and coxal sacs, female genitalia with a median cribriform plate, and articulation between femora of leg I (and II) slightly oblique towards distal end; but without any small sensory setae on abdominal sternites of male or female, without eyes, and with terminal venedentes of chelal fingers reduced in size and venom ducts not apparent.

Description: Derm thick, brown, with particles of dirt adhering to surface. Carapace about as broad as long, broadest posteriorly; posterior margin indented as 1st tergite is partially divided; surface granulate, with 2 distinct transverse furrows; no eyes present; with many clavodentate vestitural setae. Abdomen broadly oval; most tergites and sternites divided; most tergites with partial double row of clavodentate setae; sternites with acuminate setae; no tactile setae on end tergites or sternites; no small sensory setae on any sternites of ♂ or ♀. Male genitalia with many lightly to moderately sclerotised parts, generally reminiscent of withiid genitalia (cf. Heurtault, 1971: 1040); ♀ genitalia with a large median cribriform plate and lateral sclerotised parts, but no obvious spermathecae. Chelicera with 5 setae on hand; flagellum of 4 setae. Palp long and slender, chelal fingers heavy and longer than hand; surface of trochanter, femur and tibia heavily granulate, chela virtually smooth; trichobothria as in most other withiids but *sb* not so close to *b*, and *ist* closer to *esb* than to *est*; marginal teeth of chela cusped distally, becoming rounded proximally; terminal tooth or "venedens" small in both fingers, no venom duct discernible. Legs relatively short and stout; leg I typically withiid in structure, with articulation between basifemur and telofemur slightly oblique towards distal end; leg IV with femoral articulation distinctly oblique towards proximal end; pedal claws smooth; subterminal tarsal setae simple; tarsus of leg IV without a tactile seta.

Remarks: As mentioned in the diagnosis, this genus has many of the characters of the family Withiidae, most notably, the nature of the articulation between basifemur and telofemur of leg I (and II). This latter diagnostic character has been noted previously, but without emphasis, by Chamberlin (1931a: 156), Beier (1932: 192; 1963: 280), Hoff (1958: 48), and others; it was ignored completely by Muchmore (1982). As a matter of fact, it easily sets the Withiidae apart from all the other cheliferoid families. In the Cheliferidae, in which the Withiidae was formerly placed as a subfamily, the femoral segments of leg I are joined by an oblique articulation slanting proximad at an angle of up to 50° from the perpendicular to the long axis of the entire femur. That articulation is very similar in the families Chernetidae and Atemnidae, where the angle of obliquity ranges from 20° to 45°. In the Withiidae, however, the articulation between basifemur and telofemur is nearly perpendicular or slants in the opposite direction (i.e. distad) at an angle up to 10°. In addition, the femoral joint appears less mobile in the Withiidae than in the other families mentioned, though no studies have been undertaken to confirm this. Thus, the articulation of the femora of legs I and II appears to be a good diagnostic character for separation of the Withiidae from the Cheliferidae and other cheliferoid families. The new species conforms to the pattern in the Withiidae, with the femoral articulation of leg I oblique to the long axis about 5° from the perpendicular in the distal direction (Fig. 4).

The complete absence of sensory setae on abdominal sternites might seem to be an obstacle to placement of this genus in the Withiidae, but 2 other genera of this sort have already been so placed, namely, *Philomaoria* Chamberlin (1931b) from New Zealand and *Protowithius* Beier (1955) from the Juan Fernández Islands. While there may be some doubt about the placement of *Philomaoria*, as cautioned by Chamberlin (1931b: 291), the position of *Protowithius* in the Withiidae seems secure. *Termitowithius* can be distinguished easily from these 2 genera by its long slender palps, the heavy-fingered chela, and the lack of eyes.

The palp of *Termitowithius kistneri* bears a striking resemblance to that of *Reischekia coracoides* Beier, with its elongate segments, small chelal hand, and long, thick chelal fingers; indeed my first inclination was to place the new species in *Reischekia*. However, study of

specimens of *R. coracoides* and comparison with the new species in regard to the diagnostic features mentioned above revealed that the former is definitely a chernetid while the latter is a withiid. The elongate palps and distinctive chela may be associated with similar modes of life. *Termitowithius kistneri* lives in a sequestered habitat deep within termite nests, where long palps and modified chelae may serve it well; reduction of the eyes might be expected here just as eyes are reduced in hypogean and cavernicolous forms. Beier suggests that *Reischekia coracoides* lives as an ant guest, which might have resulted in similar modifications.

The reduction of the venom apparatus and venedentes is difficult to explain, unless the pseudoscorpions feed on weak, defenceless prey (termite nymphs?) which are very easily subdued without resort to poison.

***Termitowithius kistneri*, new species** (Figs. 1-7)

Material examined: Holotype ♂ (WM2662.01001) from fungus gardens in nest (T-374) of *Macrotermes subhyalinus* (Rambur) at Lake Manyara National Park, Tanzania, 19 June 1970, leg. D. H. Kistner; allotype ♀ and 9 paratypes (5♂, 4♀) from same location; 2♂ and 2♀ mounted on microscope slides. All specimens deposited in Florida State Collection of Arthropods, Gainesville, Florida, USA.

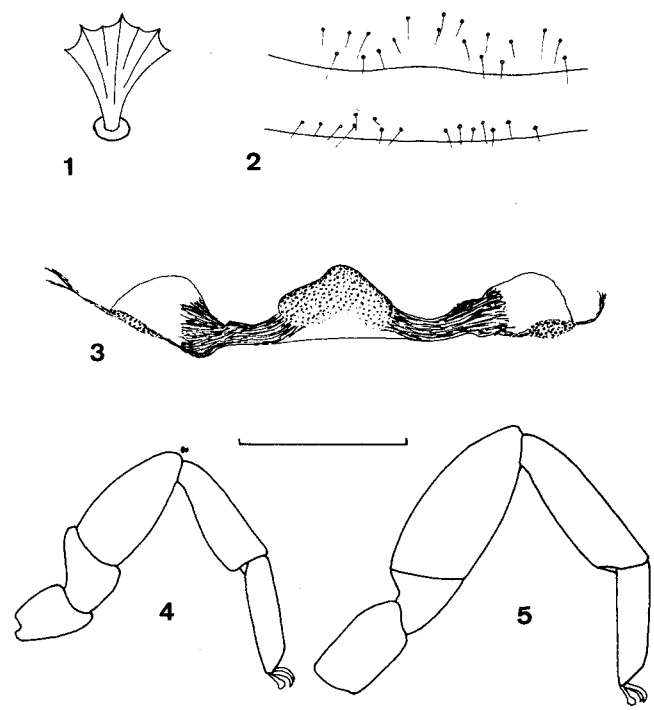
Description: Male and female similar, but latter a little larger. All parts brown, derm generally thick and granulate; particles of dirt tend to cling to surface, especially in a broad patch near base of chelal hand (Fig. 6). Carapace about as long as broad, broadest posteriorly; posterior margin indented in same way as tergite 1 is partially divided; surface heavily granulate; with 2 distinct transverse furrows; no eyes apparent; with about 150 vestitural setae, 4-6 at anterior and 30-40 at posterior margins; setae small and broadly clavodentate (Fig. 1).

Abdomen broadly oval; tergite 1 partially, others entirely, divided; sternites 5-11 partially divided; surfaces heavily granulate. Setae of tergites clavodentate, except the 2 anal setae acuminate; all setae on sternites acuminate. Tergites with 40-50 setae, in single row medially and double row laterally; anterior genital opercula of both sexes with 17-26 setae, posterior opercula with 15-20 setae, the patterns only slightly different (Fig. 2); other sternites with 20-24 setae, each lateralmost seta larger than others and situated more anteriorly; stigmatic plates with 1-2 small setae; no sternites of ♂ or ♀ with any sensory setae, such as those characteristic of most withiids; no tactile setae on end tergites or sternites. Internal genitalia of ♂ generally like those of other withiids (esp. *Withius* Kew), composed of many lightly to moderately sclerotised parts, more or less longitudinally oriented (these are easily displaced during preparation with KOH, making their relationships difficult to understand). Internal genitalia of ♀ with median oval cribriform plate and moderately sclerotised lateral parts with small cribrate areas (Fig. 3); no spermathecae apparent. In the vial, unattached to any specimen, are 2 embryo sacs, 1 with 13 and 1 (broken) with 11 embryos.

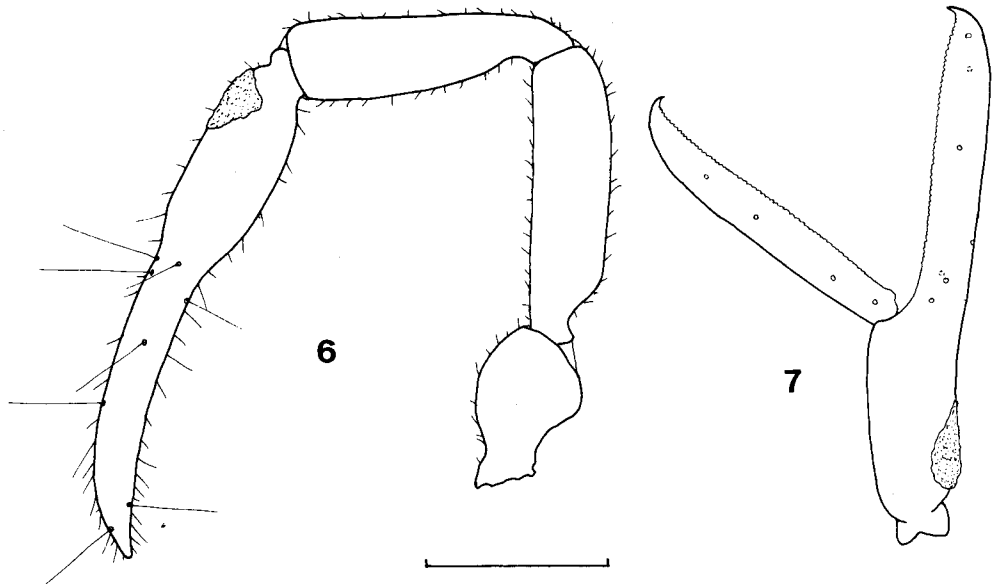
Chelicera about 0.3 as long as carapace; hand with 5 setae, *b* and *sb* short and terminally denticulate, others including *es* long, acuminate; fixed finger with 6 small teeth; movable finger with large, laterally displaced subapical lobe; galea branching, with 6-8 small rami, slightly larger in female; serrula exterior with 19-20 blades; flagellum of 4 setae, distal one sparsely dentate; lamina exterior present.

Palp rather long and slender; femur 0.85-0.9, tibia 0.75-0.85 and chela 1.35-1.45 times as long as carapace. Proportions of segments as in Fig. 6; trochanter 1.6-1.75, femur 3.85-4.1, tibia 3.5-3.75, and chela (without pedicel) 5.6-5.9 times as long as broad; hand (without pedicel) 2.05-2.2 times as long as deep; movable finger 1.67-1.73 times as long as hand. Surfaces of trochanter, femur and tibia heavily granulate, chela virtually smooth; surface with much dirt adhering, especially in a broad dorso-lateral patch on base of chelal hand (Figs. 6, 7); setae paucidenticulate to acuminate, often covered with dirt. Trichobothria as in Fig. 7; on fixed finger *est* near middle, with *it* nearer to *et* and *ist* nearer to *isb* than to *est*; on movable finger *b* and *sb* not close together, nearly as far apart as are *t* and *st*. Fixed finger with 48-55 contiguous teeth, mostly cusped but becoming rounded proximally; movable finger with 51-53 similar teeth; terminal tooth (venedens) small in both fingers; no venom ducts discernible.

Legs relatively short and stout (Figs. 4 & 5); most segments granulate dorsally. Leg I typically withiid in structure, with femora somewhat movable against one



Figs. 1-5: *Termitowithius kistneri*, n. sp. **1** Typical dorsal seta, from carapace; **2** Genital opercula, holotype ♂; **3** Internal genitalia, allotype ♀; **4** Leg I; **5** Leg IV. Scale line: Fig. 1 = 0.025 mm, Fig. 2 = 0.22 mm, Fig. 3 = 0.17 mm, Figs. 4, 5 = 0.5 mm.



Figs. 6, 7: *Termitowithius kistneri,* n. sp., holotype ♂. **6** Right palp, dorsal view; **7** Left chela, lateral view. Scale line = 0.5 mm.

another and plane of articulation slightly oblique (about 5°) from perpendicular to long axis, towards distal end; telofemur about 1.5 times as long as basifemur. Leg IV with femoral articulation distinctly oblique to long axis, towards proximal end; entire femur 2.85-3.0 times as long as deep. Tarsal claws smooth; subterminal setae acuminate; tarsus of leg IV without a tactile seta.

Measurements (mm): Figures given first for holotype ♂, followed in parentheses by ranges of other mounted specimens (1♂, 2♀). Body length 2.49 (2.86-3.62). Carapace length 0.94 (0.94-1.03). Chelicera 0.295 (0.29-0.30)/0.17 (0.155-0.18). Palpal trochanter 0.46 (0.465-0.51)/0.28 (0.28-0.295); femur 0.83 (0.85-0.865)/0.215 (0.21-0.215); tibia 0.78 (0.76-0.805)/0.215 (0.215-0.22); chela (without pedicel) 1.37 (1.39-1.405)/0.235 (0.235-0.25); hand (without pedicel) 0.52 (0.51-0.515)/0.235 (0.235-0.25); pedicel about 0.075 long; movable finger length 0.87 (0.88-0.895). Leg I: basifemur 0.26 (0.26-0.265)/0.185 (0.18-0.185); telofemur 0.38 (0.39-0.415)/0.185 (0.185); tibia 0.41 (0.41-0.415)/0.13 (0.13); tarsus 0.35 (0.34-0.35)/0.09 (0.09-0.095). Leg IV: entire femur 0.70 (0.74-0.755)/0.245 (0.245-0.26); tibia 0.525 (0.555-0.57)/0.14 (0.14-0.15); tarsus 0.37 (0.385-0.41)/0.095 (0.095).

Etymology: The new species is named for David H. Kistner who collected these and other pseudoscorpions in the course of his studies on termites.

Remarks: In the same collection with *Termitowithius kistneri* is a single ♀ of another withiid, which is smaller and of more normal proportions. In the absence of a ♂, it is impossible to place this specimen to genus. The internal genitalia seem unusual in several respects, but so little is known about withiid genitalia that these characters are of no use at the moment.

Acknowledgement

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