Rare new species of the genus *Afroleius* Mahunka, 1984 (Acari, Oribatida, Mycobatidae) from South Africa

by

Louise Coetzee
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Cover: *Afroleius caudatus* spec. nov. Dorsal aspect.
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**ABSTRACT**

Coetzee, L. 2014. Rare new species of the genus *Afroleius* Mahunka, 1984 (Acari, Oribatida, Mycobatidae) from South Africa. *Navors. nas. Mus., Bloemfontein* 30(5): 71-85. Two rare new species in the genus *Afroleius* Mahunka, 1984 are described from South Africa. *Afroleius natalensis* spec. nov. can be recognised by long, smooth lamellar setae with overlapping apices and rostral setae of medium length, thick and coarsely barbed. *Afroleius caudatus* spec. nov. is recognised by a caudal protuberance of the notogaster and long, ribbon-shaped lamellar setae. The known distribution of *A. natalensis* spec. nov. is restricted to a small area in the KwaZulu-Natal Province, while *A. caudatus* spec. nov. is represented by a few specimens from forests along the southern and eastern coastal regions and is probably arboreal.

(Oribatida, Mycobatidae, *Afroleius*, new species, South Africa)
INTRODUCTION
Since the description of the genus *Afroleius* by Mahunka (1984) from material collected in the southern parts of South Africa, three new species have been added to the genus by Coetzee (2013) with the description of *A. crassus*, *A. decurvatus* and *A. deformatoides*. Coetzee & Tiedt (2013) presented a discussion of the genus with the description of additional characters, for example the presence of axillary saccules (Grandjean 1936, Norton et al. 1997, Norton & Behan-Pelletier 1986, Norton & Behan-Pelletier 2009) and the posterior notogastral tectum (Norton & Behan-Pelletier 2009). These characters have implications for the relationship of the genus. Coetzee & Tiedt (2013) presented arguments for the inclusion of the genus in the family Mycobatidae based on adult characters. No immatures have so far been found.

Two new species are described in this paper, nl. *A. natalensis* spec. nov. and *A. caudatus* spec. nov., both regarded as rare. Oribatid mites are generally abundant in litter from the regions where these species derive from. A total of 4 430 specimens (in 54 genera) were collected from 12 samples containing litter and soil (about 500 ml each) in an area roughly 15 minutes latitude by 15 minutes longitude (approximately 690 km²), while only seven *A. natalensis* spec. nov. specimens were found. Furthermore, this species was not found in any other samples currently in the Acarology collection of the National Museum. In the case of *A. caudatus* spec. nov. only five specimens are present in the Museum’s Acarology Collection and were collected from three localities, between 400 and 600 km apart.

This work is part of a comprehensive study of the genus *Afroleius* and additional new species are in the process of being described. A key to species in the genus will be presented in a later paper.

Diagnosis of *Afroleius* Mahunka, 1984
For a comprehensive description see Coetzee & Tiedt (2013).
Integument foveate or reticulate; lamella marginal; rostral seta short to medium length; lamellar seta medium to long; interlamellar seta minute; pteromorph large, fully hinged; octotaxic system consisting of four pairs of saccules or porose areas; ten pairs of minute notogastral setae present; undivided posterior notogastral tectum present; genal notch and broad genal tooth usually present; axillary saccule of subcapitulum present; epimeral setae 3c and 4c absent; custodium absent; epimeral border 4 heavily sclerotized; pedotectum I
large, broad; genital plates with six pairs of setae, adanal setae (three pairs) inserted close to each other on postero-lateral border of anal plates; preanal organ of medium length, stem broadening towards base; postanal porose area usually present; tutorium consisting of dorsal ridge with deep incurvation in basal part; all legs heterotridactylous; tarsi I and II with dorsal dens proximal to tectal setae, varying from small point to large well-developed spur; distal end of genua I and II antiaxially with prominent cusps.

MATERIAL AND METHODS

All studied material was collected in South Africa. Soil fauna was extracted by Berlese-Tullgren funnels. Specimens were temporarily mounted on cavity slides with glycerol for study purposes and thereafter stored in 70% alcohol. A Nikon Eclipse 50i light microscope equipped with a DS-Fi1 digital camera and NIS-Elements imaging software were used for light microscope images. All material, including holotypes and paratypes, is deposited in the Acarology Collection of the National Museum, Bloemfontein, South Africa.

DESCRIPTION OF SPECIES

Afroleius natalensis spec. nov.
(Figures 1-5, 11; Plates 1 A-D, 2 A)

Species diagnosis
Dorsal surface foveate, granular integument present anterior of dorsosejugal scissure; lateral epimeral surface granulate; octotaxic system consisting of saccules with wide openings; head of bothridial seta small, clavate, sparsely barbed, stalk long, thin; rostral seta of medium length, (~ 19 µm), stout, thick at base tapering towards apex, coarsely barbed, inserted at anterior apex of tutorium; lamellar seta long (~ 55 µm), smooth, thin, curving medially; interlamellar seta minute; notogastral setae minute; postanal porose area absent; very small dorsal dens on tarsi I and II; distal end of genu I antiaxially with dorsal and ventral cusps; distal end of genu II antiaxially with lateral cusp.

Dimensions

Prodorsum (Figs 1 & 2)
Rostral margin uneven in dorsal view; prodorsal surface foveate with granular integument anterior of dorsosejugal scissure; narrow band of granular cerotegument present between lamellar apices; lamella (L) wide, extending over lateral margin of prodorsum; rostral seta (ro) of medium length, (~ 19 µm), stout, thick at base tapering towards apex, coarsely barbed, inserted at anterior apex of tutorium; lamellar seta (le) long (~ 55 µm), smooth, thin, curving medially, apices overlapping; interlamellar seta (in) minute (~ 5 µm); bothridial opening directed laterally, with overlapping slit in ventral bothridial wall; head of bothridial seta small, clavate, sparsely barbed, stalk long, thin.
Figures 1-3: *Afroleius natalensis* spec. nov. 1 - Dorsal aspect; 2 - Lateral aspect; 3 - Ventral aspect.

Scale bar 100 µm
Notogaster (Figs 1 & 2; Pl. 1 C)
Surface foveate; octotaxic system consisting of saccules, openings of saccules wide, surrounded by thickened integument; ten pairs of minute (~7 µm) notogastral setae present; lyrifissure im clearly visible; orifice of opisthosomal gland (gla) very small, situated medially of h3.

Podosoma and Gnathosoma (Figs 2 & 3; Pl. 1 D)
Surface of mentum anteriorly faintly foveate, fading posteriorly; genal notch (gn) present; genal tooth broad, short; axillary saccule short; epimeral setae minute; epimeral surface antero-medially foveate, laterally granulate; epimeral seta 1c absent; tutorium (tu) narrow.

Ventral plate (Fig. 3; Pl. 1 A)
Surface of genital plate without clear foveae or striae; surface of anal plate foveate; ventral plate with large foveae; broad band of granular integument along border of ventral plate; iad situated laterally of anal plate; ad1, 3 inserted postero-laterally to anal plate, posterior to iad; postanal porose area absent.
Plate 1 A-D: *Afroleius natalensis* spec. nov. A - Lateral aspect, showing granular border of ventral plate; B - Leg I. Dorsal dens on tarsus (a) and cusps on genu (b) indicated; C - Fragment of notogaster. Pteromorph (*pter*), setae *la*, *c2* and saccule *Sa* indicated; D - Epimeral region. Pedotectum II (*pdII*) and discidium (*disc*) indicated.
Plate 2 A: *Afroleius natalensis* spec. nov. A - Leg IV. Thick integument (a) and tectum (b) on tarsus and tectum (c) on femur indicated. Plate 2 B-D: *Afroleius caudatus* spec. nov. B - Dorsal aspect; C - Ventral aspect; D - Leg II. Solenidion on tibia (a) and dorsal dens on tarsus (b) indicated.
**Legs** (Figs 4 & 5, Pls 1 B & 2 A)

**Setal formula** (trochanter to tarsus, famulus included): Leg I 1-5-3-4-20; Leg II 1-5-3-4-15; Leg III 2-2-1-3-15; Leg IV 1-2-2-3-12. **Solenidial formula** (genu to tarsus): Leg I 1-2-2; Leg II 1-1-2; Leg III 1-1-0; Leg IV 0-1-0.

Legs relatively short; dorsal integument of tarsi I, II and IV and tibiae I, II and IV thick; medial claw of all legs strong, lateral claws thin. **Leg I**: Very small dens present on dorsal side of tarsus proximal to tectal setae; antiaxial fastigial seta (ft”) very short and thin; famulus (ε) short; distal end of genu antiaxially with dorsal and ventral cusps. **Leg II**: Tarsus short, broad; small dens present on dorsal side of tarsus proximal to tectal setae; distal end of genu antiaxially with ventral cusp. **Leg III**: Relatively short. **Leg IV**: Dorsal surface of tarsus and tibia uneven, integument thick; tarsus antiaxially with diagonal tectum running from insertion of ft” towards proximo-lateral base of segment; femur ventrally with wide tectum; dorsal seta (d) on femur thick, roughened.

**Material examined** (Fig. 11): Holotype (male) (NMB 1949.16.1) and four paratypes (three females, one male) collected between Ixopo and Bulwer 30°03’S 29°55’E, KwaZulu-Natal, 9 February 1982 (C.M. Engelbrecht), moist litter underneath stands of large trees. Additional material collected between Richmond and Ixopo 30°02’S 30°13’E, KwaZulu-Natal, 9 February 1982 (C.M. Engelbrecht), litter and soil underneath Aloe.

**Etymology**
The species name refers to the province KwaZulu-Natal, the only province where it has so far been located.

**Remarks**
This species can readily be distinguished from other *Afroleius* species by the long, smooth, overlapping lamellar setae and short, thick, coarsely barbed rostral setae. The dorsal dens on tarsi I and II is much reduced. The bothridium has a slit in the ventral wall of which the sides overlap, similar to *A. minor* Mahunka, 1984 (Coetzee & Tiedt 2013, Fig. 8). This is a rare species, where only a few specimens were collected from otherwise rich samples, as discussed in the Introduction. The Acarology collection of the National Museum is reasonably representative of the South African oribatid fauna, and the so far known distribution of *A. natalensis* spec. nov. is restricted to a small area (see Fig. 11).

**Afroleius caudatus** spec. nov.
(Figures 6-10, 11; Plates 2 B-D)

**Species diagnosis**
Outline of notogaster and rostrum uneven; posteriorly notogaster with clearly defined caudal protuberance; dorsal and ventral surfaces foveate; octotaxic system consisting of porose areas; head of bothridial seta large, more or less globular, surface coarsely punctate, stalk thin, short; rostral seta of medium length, densely barbed; lamellar seta long, smooth, ribbon-shaped with defined central core, apex pointed; interlamellar seta minute; notogastral setae minute; postanal porose area present; dorsal dens on tarsi I and II of medium size; distal end of genua I and II antiaxially with lateral cusp; solenidion σ on genua I and II and φ on tibia II hook-shaped.
Figures 6-8: *Afroleius caudatus* spec. nov. 6 - Dorsal aspect; 7 - Lateral aspect; 8 - Ventral aspect (NB: note that the postanal porose area (*pa*) is a structure of the ventral plate). Scale bar 100 µm
Dimensions


**Prodorsum** (Figs 6 & 7, Pl. 2 B)
Rostral margin uneven in dorsal view; prodorsal surface with large foveae; lamella (L) wide, extending over lateral margin of prodorsum; prodorsum sharply sloped between lamellar apices, creating the impression of a translamella in dorsal view; rostral seta (ro) of medium length (~ 24 µm), thick, densely barbed, inserted at anterior apex of tutorium; lamellar seta (le) long (~ 50 µm), ribbon-shaped with defined central core, smooth, curved medially, apices pointed; interlamellar seta (in) minute (~ 6 µm); bothridium small, mostly

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**Figures 9-10:** *Afroleius caudatus* spec. nov. 9 – Leg I, antiaxial aspect; 10 – Tarsus, Tibia and Genu II, antiaxial aspect. Scale bar 50 µm
hidden below pteromorph, opening directed ventrally; head of bothridial seta large, more or less globular, surface coarsely punctate, stalk thin, short.

**Notogaster** (Figs 6 & 7, Pl. 2 B)
Notogastral outline uneven; posteriorly notogaster with clearly defined caudal protuberance; surface with large foveae; octotaxic system consisting of large porose areas, position of porose areas the same in males and females; ten pairs of minute (~ 6 µm) notogastral setae present; lyrifissure *im* clearly visible; orifice of opisthosomal gland (*gla*) very small, situated medially of *h*₃.

**Podosoma and Gnathosoma** (Figs 7 & 8)
Surface of mentum foveate; genal notch (*gn*) and genal tooth indistinct; axillary saccule short; epimeral surface foveate; epimeral setae minute; epimeral seta *lc* absent; apodemata short; tutorium (*tu*) narrow.

**Ventral plate** (Fig. 8, Plate 2 C)
Surface of genital and anal plates with small foveae; surface of ventral plate with large foveae; *iad* situated laterally of anal plate; *ad*₁₃ inserted postero-laterally to anal plate, posterior to *iad*; postanal porose area (*pa*) large.

**Legs** (Figs 9 &10, Pl. 2 D)
Setal formula similar to *A. natalensis* spec. nov.
Legs relativley short; dorsal integument of tarsi I, II and IV and tibiae I, II and IV thick; medial claw of all legs strong, lateral claws thin. **Leg I:** Medium-sized dens present on dorsal side of tarsus proximal to tectal setae; antiaxial fastigial seta (*ft") short and thin; famulus (*ε*) of medium length; distal end of genu antiaxially with ventral cusp; solenidion (*σ*) on genu short, hook-shaped, curving antiaxially. **Leg II:** Tarsus short, broad; medium dens present on dorsal side of tarsus proximal to tectal setae; distal end of genu antiaxially with ventral cusp; apices of solenidia on tarsus (*ω₁* and *ω₂*) slightly bent; solenidion (*φ*) on tibia short, hook-shaped, curving antiaxially; solenidion (*σ*) on genu very short, hook-shaped, curving antiaxially. **Leg III:** Relatively short. **Leg IV:** Dorsal surface of tarsus and tibia uneven, integument thick; tarsus antiaxially with diagonal tectum running from insertion of *ft"* towards proximo-lateral base of segment; femur ventrally with wide tectum; dorsal seta (*d*) on femur thick, roughened.

**Material examined** (Fig. 11): Holotype (female) (NMB 3676.2.1) and two paratypes (males) collected at Dwesa forest 32° 15’ 17” S, 28° 52’ 39” E, Wild Coast, Eastern Cape Province, January 1990 (F. Brusse) feeding on understorey leaves of *Buxus natalensis*. Additional material: Tuin van Eden (between Knysna and Plettenberg Bay) 34° 01’ 35” S, 23° 11’ 37”E, Western Cape Province, 28 January 1963 (R. van Pletzen) litter from indigenous forest; between Highflats and Scottburgh 30° 16’ 50” S, 30° 26’ 16” E, KwaZulu-Natal, 2 September 1982 (C.M. Engelbrecht) litter.

**Etymology**
The species name refers to the caudal protuberance on the posterior margin of the notogaster.
Remarks

*Afroleius caudatus* spec. nov. is easily distinguished from other *Afroleius* species by the caudal protuberance as well as long, broad, ribbon-shaped lamellar setae. This species is almost certainly arboreal as the holotype and two paratypes from Dwesa forest have been collected directly from understorey leaves, noted as “feeding on leaves”. The almost globular shape of the head of the bothridial seta, short bothridial stalk (the stalk is noticeably shorter than that of other *Afroleius* species) and large porose areas also indicate an arboreal habitat (Aoki 1973; Behan-Pelletier & Walter 2000; Karasawa & Hijii 2004). The only other specimens encountered so far (one from each locality) have been collected from litter, but may have landed in the litter accidentally. This species is regarded as rare since very few specimens have been encountered so far, collected from three well-separated localities. However, arboreal surveys may indicate a wider distribution.

Figure 11: Known distribution of *Afroleius natalensis* spec. nov. and *A. caudatus* spec. nov.
DISCUSSION

These two new species bring the number of *Afroleius* species to eight, together with the three original species *A. deformis*, *A. minor* and *A. simplex* described by Mahunka (1984) (redescribed by Coetzee (2007)) and three new species *A. crassus*, *A. decurvatus* and *A. deformatoides* described by Coetzee (2013). This genus is widely distributed along the southern and eastern coastal regions of South Africa with generally more forested areas and a much higher rainfall than the central and western parts. Further studies will undoubtedly produce more new species.

OPSOMMING

Twee skaars spesies in die genus *Afroleius* Mahunka, 1984 van Suid-Afrika word beskryf. *Afroleius natalensis* spec. nov. word herken aan lang, gladde lamellaarsetas waarvan die punte oor mekaar vou en medium-lang, dik, grawwe rostralsetas. *Afroleius caudatus* spec. nov. word uitgeken aan 'n gepunte uitsteeksel aan die posterior rand van die notogaster en lang, lintvormige lamellaarsetas. Die tot dusver bekende verspreiding van *A. natalensis* spec. nov. is beperk tot 'n klein gebied in die KwaZulu-Natal-provinsie, terwyl *A. caudatus* spec. nov. deur slegs 'n paar eksemplare van die suidelike en oostelike kusstreke verteenwoordig word en heel moontlik boomlewend is.

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VOLUME 28 2012

Deel 1: Havenga, S. & Wessels, A. “Examplair” – Victorianse merklappe met specifieke verwysing na voorbeelde in die versameling van die Nasionale Museum, Bloemfontein ........................................... 1


Deel 4: Haasbroek, H. Die rol van Charles (Charlie) Gustav Fichardt in Bloemfontein 1891-1923 .................. 49

VOLUME 29 2013

Part 1: Couri, M.S., Kirk-Spriggs, A.H. & Pont, A.C. New distribution records of Afrotropical Muscidae (Diptera) based on material at the National Museum, Bloemfontein .................. 1

Part 2: Bates, M.F. First records of the egg-eating snake Dasyptelis confusa Trape & Mané, 2006 in Nigeria and Chad, with range extensions for Ghana ................................................................. 17

Part 3: Du Bruyn, D. & Wessels, A. The British soldiers' Bloemfontein: impressions and experiences during the time of the British occupation and Lord Roberts' halt, 13 March-3 May 1900 ...................... 29