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Oribatid mites of the superfamily Galumnoidea from Zambia, with description of a new species of the genus *Galumna* (Acari: Oribatida)

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ABSTRACT. An annotated checklist of registered galumnoid mites from Zambia is presented. Five species, four genera and two families have been found. All taxa (except family Galumnidae) represent the first records from Zambia. A new species of the genus *Galumna*, *Galumna wojciechniedbalai* sp. nov., is described. In having the combination of straight lamellar lines, directed to insertion of rostral setae, and sensilli, having a dilated head, a new species resembles *Galumna aba* MAHUNKA, *G. araujo* PÉREZ-ÍÑIGO & BAGGIO and *G. gibbula* GRANDJEAN. However, it is clearly different from the listed species in several characters (body size, lengths of lamellar setae, presence or absence of interlamellar setae and dorsosejugal furrow, morphology of sensilli and porose areas).

Key words: acarology, taxonomy, Oribatida, fauna, Galumnoidea, checklist, new species, new record, *Galumna*, Zambia.

INTRODUCTION

The oribatid mite fauna of Zambia is poorly studied. At present, only one species, one genus and one family of oribatids are recorded (MWASE and BAKER 2006): *Orthogalumna terebrantis* WALLWORK, 1965 (Galumnidae).

The present study is based on Zambian material collected by my Polish colleague, Wojciech NIEDBAŁA, during a visit to 5th African Acarology Symposium, Livingstone, Zambia in May 2011. This work includes the data about species from the superfamily Galumnoidea. An annotated checklist of identified oribatids is presented below (see *Checklist of Galumnoidea of Zambia* section). In the course of taxonomic identification, one new species belonging to the subgenus *Galumna* (*Galumna*) HEYDEN, 1826, was found.

Galumna (*Galumna*) is a subgenus of a cosmopolitan distribution, comprising 161 species (SUBÍAS 2004, online version 2012). The main generic characters of the subgenus have been summarized by other authors (for example, ENGELBRECHT 1972; BALOGH and BALOGH 1992).

MATERIAL AND METHODS

List of collecting sites:

Z-1-2: Zambia, environmental of Livingstone, near Mukuni Village, litter under dry bush on the hill, 19.05.2011, coll. W. Niedbala.

Z-3: Zambia, environmental of Livingstone, Victoria Falls Gorge, rain forest, decayed material between rocks, 20.05.2011, coll. W. Niedbala.

Z-4: Zambia, environmental of Livingstone, Victoria Falls Gorge, rain forest, litter general sample, 20.05.2011, coll. W. Niedbala.

Specimens of a new species described below were studied and illustrated in lactic acid, mounted on temporary cavity slides for the duration of the study. All body measurements are presented in micrometers. Body length was measured in lateral view. Notogastral width refers to the maximum width in dorsal aspect. Formulae for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formulae for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus.

Terminology used in this paper follows that of F. GRANDJEAN (TRAVÉ and VACHON 1975 for many references).

RESULTS

The galumnoid oribatids were found from two sites. Five species, four genera and two families have been found. All taxa (except family Galumnidae) are the first records for Zambia.

Checklist of Galumnoidea of Zambia:

Galumnidae

— *Galumna* (*Galumna*) *wojciechniedbalai* sp. nov. Locality: Z-3, Z-4.

Distribution: Zambia

— *Pergalumna poci* MAHUNKA, 1984. Locality: Z-3, Z-4.

Distribution: Tanzania

— *Pergalumna tsavoensis* MAHUNKA, 1986. Locality: Z-4.

Distribution: Kenya

— *Trichogalumna nipponica* (AOKI, 1966). Locality: Z-3, Z-4.

Distribution: Palearctica, Oriental region

Galumnellidae

— *Galumnella subareolata* MAHUNKA, 1969. Locality: Z-4.

Distribution: Ethiopian region

***Galumna wojciechniedbalai* sp. nov.**

(Figs. 1-7)

DIAGNOSIS

Body size 481–498 × 332–348; rostrum rounded; lamellar lines not parallel to sublamellar lines, straight, directed to insertions of rostral setae; rostral and lamellar setae similar in length, both shorter than interlamellar setae; sensilli with long stalk and unilaterally developed, barbed head; dorsosejugal furrow complete; four pairs of round, oval porose areas, median pore and postanal porose area present.

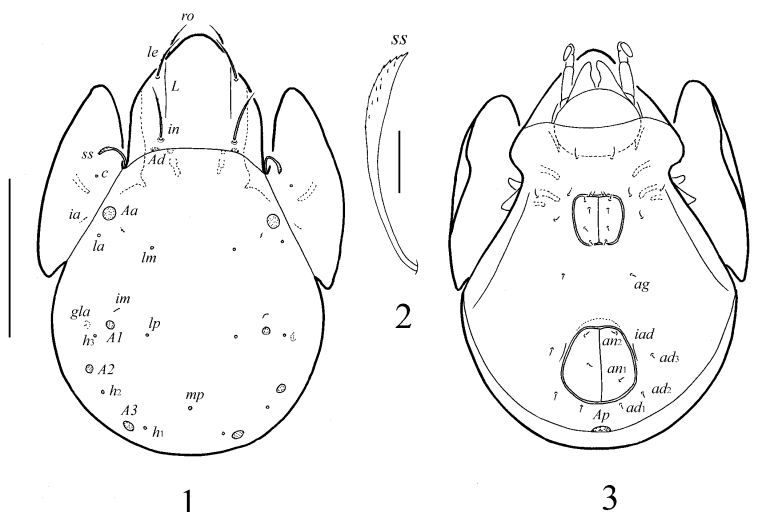
DESCRIPTION

Measurements – Body length 481 (holotype), 498 (paratype); body width 332 (holotype), 348 (paratype).

Integument – Body color brown. Surface of body smooth.

Prodorsum (Figs. 1, 2, 4, 5) – Rostrum rounded in dorsal view. Sublamellar lines (*S*) of typical structure. Lamellar lines (*L*) not parallel to sublamellar lines, straight, directed to insertions of rostral setae. Rostral (*ro*, 53–57), lamellar (*le*, 53–53) and interlamellar (*in*, 77–82) setae setiform, barbed. Interlamellar setae straight, directed upwards. Sensilli (*ss*, 69) with long stalk and unilaterally developed head. Sensillar heads barbed, pointed distally in lateral view. Exobothridial setae not observed. A pair of oval porose areas *Ad* present posterior to interlamellar setae.

Notogaster (Figs. 1, 6, 7) – Dorsosejugal furrow complete. Dorsophragmata long. Pteromorphs smooth. Notogastral setae represented by 10 pairs of alveoli. Alveoli of etae *c* inserted considerable near to hinge than to margin. Four pairs of round, oval



1-3. *Galumna wojciechniedbalai* sp. nov.: 1 – dorsal view, 2 – sensillus, 3 – ventral view, legs not shown.
Scale bars 1, 3: 200 µm, scale bar 2: 20 µm

porose areas developed: *Aa* 20, *A1* 10–12, *A2* 12, *A3* 16. Median pore present anteriorly to level of porose areas *A3*. Lyrifissures *im* located anteriorly to *A1*.

Gnathosoma – Typical for *Galumna* (for example, see ENGELBRECHT 1972; ERMILOV and ANICHKIN 2010; ERMILOV et al. 2011).

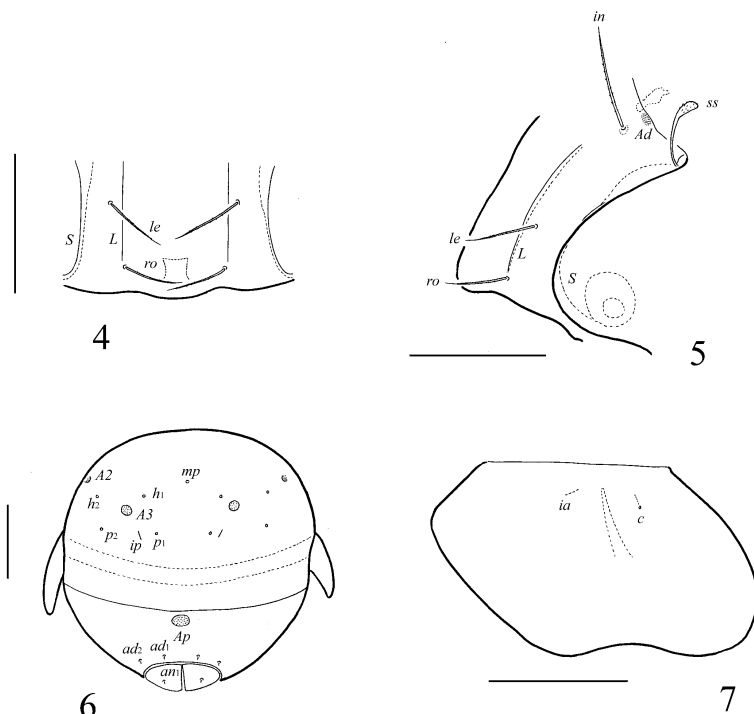
Epimeral region (Fig. 3) – Four pairs of setiform, slightly barbed epimeral setae (*la* 20, others 16) observed. Epimeral setal formula: 1–0–2–1.

Anogenital region (Figs. 3, 6) – Six pairs of genital (8–10), one pair of aggenital (*ag*, 8), three pairs of adanal (*ad*₁–*ad*₃, 10) and two pairs of anal (*an*₁–*an*₂, 8) setae setiform, thin, slightly barbed. Anterior part of genital plates with two setae. Lyrifissures *iad* long, thin, in paraanal position, located to anal plates. Postanal porose area (*Ap*, 24) present.

Legs – Morphology of leg segments, setae and solenidia typical for *Galumna* (for example, see ENGELBRECHT 1972; ERMILOV and ANICHKIN 2010; ERMILOV et al. 2011). Formulae of leg setation and solenidia: I (1–4–3–4–20) [1–2–2], II (1–4–3–4–15) [1–1–2], III (1–2–1–3–15) [1–1–0], IV (1–2–2–3–12) [0–1–0]; homology of setae and solenidia indicated in Table 1.

MATERIAL EXAMINED

Holotype (male) and paratype (male): Z-3, Z-4.



4–7. *Galumna wojciechniedbalai* sp. nov.: 4 – rostrum, anterior view, 5 – prodorsum, lateral view, gnathosoma and legs not shown, 6 – posterior view, 7 – pteromorphs. Scale bars: 100 µm

TYPE DEPOSITION

The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; one paratype is in the collection of the Siberian Zoological Museum, Novosibirsk, Russia.

ETYMOLOGY

The specific name is dedicated to our colleague, the acarologist Prof. Wojciech NIEDBALA (Department of Animal Taxonomy and Ecology, Adam Mickiewicz University, Poznan, Poland) for his extensive contribution to our knowledge of ptyctimous mites.

REMARKS

In having the combination of straight lamellar line, directed to insertion of rostral setae, and sensilli, having a dilated head, *Galumna wojciechniedbalai* sp. nov. is similar to *Galumna aba* MAHUNKA, 1989 from Vietnam), *Galumna araujoi* PÉREZ-ÍÑIGO & BAGGIO, 1994 from Brazil and *Galumna gibbula* GRANDJEAN, 1956 from the Mediterranean region.

Galumna wojciechniedbalai sp. nov. differs from *Galumna aba* by the larger body size (481–498 × 332–348 versus 338–413 × 240–274 in *G. aba*), well developed lamellar setae (similar to rostral setae in length) (versus considerable shorter than rostral setae in *G. aba*), presence of long interlamellar setae and dorsosejugal furrow (versus all absent in *G. aba*), rounded notogastral porose areas (versus *Aa* triangular, *A2* and *A3* elongate oblong in *G. aba*).

Galumna wojciechniedbalai sp. nov. differs from *Galumna araujoi* by the smaller body length (481–498 versus 614–641 in *G. araujoi*), well developed lamellar setae (similar to rostral setae in length) (versus considerable shorter than rostral setae in *G. araujoi*), presence of long interlamellar setae (versus absent in *G. araujoi*), well dilated sensillar head (versus weakly dilated in *G. araujoi*), rounded notogastral porose areas (versus *Aa* triangular in *G. araujoi*), localization of lyrifissures *iad* in paraanal position (versus in inverse apoanal in *G. araujoi*).

Table 1. Leg setation and solenidia of *Galumna wojciechniedbalai* sp. nov.

Leg	Trochanter	Femur	Genu	Tibia	Tarsus
I	v'	d, (l), bv''	(l), v', σ	(l), (v), φ ₁ , φ ₂	(ft), (tc), (it), (p), (u), (a), s, (pv), v', (pl), l'', e, ω ₁ , ω ₂
II	v'	d, (l), bv''	(l), v', σ	(l), (v), φ	(ft), (tc), (it), (p), (u), (a), s, (pv), ω ₁ , ω ₂
III	v'	d, ev'	l', σ	l', (v), φ	(ft), (tc), (it), (p), (u), (a), s, (pv)
IV	v'	d, ev'	d, l'	l', (v), φ	fi'', (tc), (p), (u), (a), s, (pv)

Roman letters refer to normal setae (*e* – famulus), Greek letters refer to solenidia. One apostrophe (') marks setae on anterior and double apostrophe (') setae on posterior side of the given leg segment. Parentheses refer to a pair of setae.

Galumna wojciechniedbalai sp. nov. differs from *Galumna gibbula* by the well developed lamellar setae (similar to rostral setae in length) (versus considerable shorter than rostral setae in *G. gibbula*), well dilated sensillar head (versus weakly dilated in *G. gibbula*), presence of dorsosejugal furrow (versus interrupted medially in *G. gibbula*), rounded notogastral porose areas and postanal porose area (versus *A3* and *Ap* elongate oblong in *G. gibbula*).

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