

A NEW GENUS AND SPECIES OF THE FAMILY NEOPYGMEPHORIDAE (ACARI: HETEROSTIGMATA: PYGMEPHOROIDEA) ASSOCIATED WITH *GEOTRUPES SPINIGER* (COLEOPTERA: GEOTRUPIDAE) FROM UKRAINE

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ABSTRACT: A new genus and species, *Pseudokerdabania geotruperum* gen. et sp. n., collected under the elytra of the beetle *Geotrupes spiniger* (Marsham, 1802) (Coleoptera: Geotrupidae) from Ukraine is described.

KEY WORDS: Pygmephoroidae, Neopygmephoridae, new genus, new species, phoresy, Geotrupidae, Ukraine

INTRODUCTION

During a study of mites associated with beetles in Ukraine collected by the junior author, a new genus and species of mite family Neopygmephoridae was found under the elytra of *Geotrupes spiniger* (Marsham, 1802) (Coleoptera: Geotrupidae). The purpose of this paper is to describe the new genus and species, *Pseudokerdabania geotruperum* gen. et sp. n. from Ukraine.

MATERIALS AND METHODS

Mites were collected from coleopteran hosts and mounted in Hoyer's medium. In the description, the terminology of idiosoma and legs follows Lindquist (1986). The nomenclature of subcapitular and cheliceral setae follows Grandjean (1944, 1947), respectively. The systematics of Pygmephoroidae follows Khaustov (2004, 2008). All measurements are given in micrometers (μm) for the holotype and paratype (in parentheses). In descriptions of leg chaetotaxy, the number of solenidia is given in parentheses.

SYSTEMATICS

Family Neopygmephoridae Cross, 1965

Genus *Pseudokerdabania* Khaustov et Trach gen. n.

Type species: *Pseudokerdabania geotruperum* Khaustov et Trach sp. n.

Description. Female. Gnathosomal capsule longer than width. Dorsal gnathosoma with two pairs of cheliceral setae (*cha* and *chb*) and pair of postpalpal setae (*pp*). Dorsal medial apodeme well developed. Ventral gnathosoma with one pair of setae *m*. Palps short, with setae *dFe* and *dGe* dorsolaterally, one small solenidion and accessory setigenous structure ventrally, and terminated with small claw. Pharyngeal pump 2 very long, longer

than gnathosoma, pharyngeal pump 3 very small, vestigial.

Idiosomal dorsum. Prodorsum with 2 pairs of setae (v_2 , sc_2), a pair of clavate trichobothria (sc_1) and pair of oval stigmata. Posterior margin of prodorsal plate straight and distinctly separated from tergite C by area of soft cuticle. Posterior margin of tergites C and D distinctly concave. Two pairs of cupules (*ia*, *ih*) present on tergites D and H respectively.

Idiosomal venter. Epimeres I and II with two pairs of setae each. Setae *1b* bifurcate. Apodemes 2 thin, joined with presternal apodeme. Apodemes 3 long and diffuse, apodemes 4 relatively short and reach only to bases of setae *3b*. Apodemes 5 absent. Setae of posterior sternal plate smooth, relatively short. Posterior margin of posterior sternal plate divided into 3 parts, median part forms distinct lobe. Three pairs of simple pseudanal setae (ps_1 – ps_3) present. Posterior genital sclerite relatively large, triangular.

Legs. Leg I. Tibiotarsus of leg I cylindrical, with well developed pinnaculum bearing eupathidia *tc'*, *tc''*, *ft'*. Tarsal claw modified, with long and thin distal part, situated on distinct pretarsus. Setae *u'* and *u''* modified to form a structure opposite to claw. Setae *k* long, barbed, not eupathidium-like. Setae *dFeI* hook-like. Setal formula: Tr1–Fe3–Ge4–TiTa16(4). Leg II. Setal formula: Tr1–Fe3–Ge3–Ti4(1)–Ta6(1). Tarsus with padded claws. Modified setae absent. Leg III. Setal formula: Tr1–Fe2–Ge2–Ti4(1)–Ta6. Claws as on leg II. Leg IV. Setal formula: Tr1–Fe2–Ge1–Ti4(1)–Ta6. Claws well developed, simple, empodium large. Tarsus IV not extremely long, with short pretarsus.

Male and larva unknown.

Diagnosis. By the characteristic shape of the posterior margins of tergites C and D, and the posterior sternal plate, the prodorsal plate separated from tergite C by soft cuticle, and by the relatively short setae of the poststernal plate, the new genus is most similar to genus *Kerdabania* Khaustov, 2009. It differs from *Kerdabania* by a very large second pharyngeal pump and vestigial third pharyngeal pump (in *Kerdabania* third pharyngeal pump is well developed, oval, and only slightly shorter than second pharyngeal pump). The new genus differs also by the modified tibiotarsal claw (simple in *Kerdabania*) and by the presence of modified setae *u'-u''* on tibiotarsus I which form a structure opposite to the claw (absent in *Kerdabania*). It also differs from *Kerdabania* by the presence of two pairs of dorsal cheliceral setae (only one present in *Kerdabania*) and by the long, pointed and barbed seta *k* on tibiotarsus I (short, blunt-ended, eupathidium-like in *Kerdabania*).

By the relatively short setae of the posterior sternal plate, the short tarsus IV, the modified claw on tibiotarsus I, the bifurcate setae *1b*, the unmodified setae *k* on tibiotarsus I, and the relatively short apodemes 4, the new genus is also similar to the genus *Pseudopygmephorus* Cross, 1965, but differs by the prominent solenidion ω_1 on tibiotarsus I (completely or partially fused with tibiotarsus in *Pseudopygmephorus*), by the tripartite posterior margin of the poststernal plate (entire in *Pseudopygmephorus*), by the large second pharyngeal pump and the vestigial third pharyngeal pump (subequal, oval second and third pharyngeal pumps in *Pseudopygmephorus*).

The new genus is also similar to some species of the genus *Bakerdania* Sasa, 1961, especially to *B. uenoi* Kurosa, 1995 and *B. loricophila* Sevastianov, 1981. Both of these species have similar tripartite posterior margin of the poststernal plate, short and smooth setae of the poststernal plate, the modified claw on tibiotarsus I, short tarsus IV, and are associated with beetles. In our opinion the placement of these species in the genus *Bakerdania* is doubtful because species of *Bakerdania* sensu stricto, including the type species *Bakerdania cultrata* (Berlese, 1904) redescribed by Rack (1966) have the entire posterior margin of the poststernal plate and the long and thin tarsus IV. Probably *B. uenoi* and *B. loricophila* also belong to *Pseudokerdabania* gen. n., but the structure of the pharyngeal pumps is not described for them and their placement into the genus *Pseudokerdabania* gen. n. is also unclear.

Species included. The new genus currently includes only one species *Pseudokerdabania geotruperum* Khaustov et Trach sp. n.

Distribution and habitat. The type species of the genus *Pseudokerdabania* is known only from Ukraine. Adult females of *P. geotruperum* are found phoretic under the elytra of earth-boring dung beetle *Geotrupes spiniger* (Coleoptera: Geotrupidae).

Etymology. The generic name is derived from the name of a closely related genus, *Kerdabania*, and the prefix *pseudo*.

***Pseudokerdabania geotruperum*
Khaustov et Trach sp. n.**

Figs 1–7.

Description. Female. Idiosomal length: 264 (260), maximum width 133 (112).

Gnathosoma (Figs. 1–2). Cheliceral setae subequal, pointed. Postpalpal setae short, peg-like. Dorsal medial apodeme well developed. Posterior margin of gnathosomal capsule ventrally deeply concave. Accessory setigenous structure relatively small. Pharyngeal pumps as on fig. 3.

Idiosomal dorsum (Fig. 1). Stigmata almost round. All tergites with numerous very small dimples. All dorsal setae barbed, except smooth v_2 . Setae *d* and *e* blunt ended, other dorsal setae pointed. Length of dorsal setae: v_2 8 (10), sc_2 42 (44), c_1 44 (45), c_2 57 (54), d 34 (29), e 18 (15), f 55 (46), h_1 46 (40), h_2 51 (43). Distances between dorsal setae: v_2-v_2 26 (22), sc_2-sc_2 29 (26), c_1-c_1 46 (44), c_1-c_2 23 (20), $d-d$ 36 (31), $e-f$ 7 (7), $f-f$ 56 (47), h_1-h_1 28 (25), h_1-h_2 14 (12). Trichobothrium with thin stem, distally spherical with pointed tip.

Idiosomal venter (Fig. 2). Setae of anterior sternal plate distinctly barbed, other ventral setae smooth and pointed. All ventral plates with numerous very small dimples. Apodemes 1 well developed and joined with presternal apodeme, apodemes 2 very thin medially and well sclerotized laterally; sejugal apodeme weakly developed in medial part and strong laterally; apodemes 3 relatively long, diffuse. Apodemes 4 well sclerotized and joined with poststernal apodeme. Posterior margin of aggenital plate rounded. Length of ventral setae: *1a* 29 (24), *1b* 22 (17), *2a* 33 (30), *2b* 34 (32), *3a* 21 (16), *3b* 23 (18), *3c* 20 (16), *4a* 22 (13), *4b* 28 (25), *4c* 22 (21), ps_1 12 (10), ps_2 8 (6), ps_3 9 (9).

Legs (Figs. 4–7). Leg I (Fig. 4). Solenidion ω_1 6 (7) finger-shaped, solenidia ω_2 2 (2) and ϕ_2 3 (3) very small, peg-like. Solenidion ϕ_1 7 (8) clavate. Setae *l'Fel* and *l'Gel* blunt-ended. Leg II (Fig. 5).



Figs. 1–2. *Pseudokerdabania geotruporum* sp. n., female: 1 — dorsum, 2 — venter.

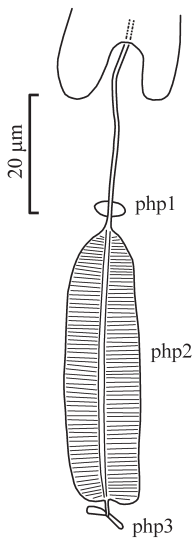


Fig. 3. *Pseudokerdabania geotruporum* sp. n., female pharyngeal pumps.

Solenidion ω 6 (6) finger-shaped. Leg III as on fig. 6. Leg IV (Fig. 7). Setae $v''TiV$ blunt-ended.

Type material. Female holotype, slide No. VT280710, UKRAINE, Lugansk prov, Melovskoj

distr., vic. of Krinichnoe, branch of Lugansk Nature Reserve “Streltsovskaya steppe”, under elytra of *Geotrupes spiniger* (Marsham, 1802), 28 July 2010 (coll. V.A. Trach); paratype: 1 females, with same data as holotype.

Type depositories. The holotype deposited at the collection of the Nikita Botanical Gardens — National Scientific Centre, Yalta, Ukraine; the paratype is at the collection of Zoological Museum of I.I. Mechnikov Odessa National University, Ukraine.

Etymology. The name of new species refers to the phoretic association of new species with beetles of the genus *Geotrupes*.

Differential diagnosis. The new species is most similar to *Bakerdania uenoi* Kurosa, 1995 and *B. lorichophila* Sevastianov, 1981 (see the generic diagnosis above), but differs from these species by the bifurcate setae 1b (not bifurcate in *B. uenoi* and *B. lorichophila*) and by the subequal se-

neopygmephorid mites lack eupathidion *p'* and have 3 setae on femur I. Thus, we classify *Sasandania* in the family Pygmephoridae. Representatives of only 3 genera are known to be associated with scarabaeoid beetles (Coleoptera: Scarabaeoidea). *Bakerdania tenuispina* Sevastianov, 1974 is phoretic on beetles of the genus *Pleurophorus* (Coleoptera: Scarabaeidae) (Khaustov and Hajiqanbar 2004; Khaustov 2011). The position of *B. tenuispina* in the genus *Bakerdania* is doubtful because females of this species have a short tarsus IV, well developed postpalpal setae and the palps lacking setae *dFe*, while species of *Bakerdania* sensu stricto have a long and narrow tarsus IV, the palps always with setae *dFe* and lacking the postpalpal setae. In our opinion, *Bakerdania tenuispina* should be placed in separate, monotypic genus. It will be done by the senior author elsewhere. *Aegyptophorus shibinensis* Sevastianov et Abokorah, 1984 is phoretic on beetles of the genus *Onthophagus* (Coleoptera: Scarabaeidae) (Kurosa 2002; Khaustov 2011). Finally, some species of *Pseudopygmephorus* are phoretic on different dung beetles of the family Scarabaeidae (Khaustov 2010). Thus *Pseudokerdabania geotruperum* sp. n. is the only species known to be phoretic on beetles of the family Geotrupidae.

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