

ZETORCHELLA NORTONI, A NEW SPECIES OF ORIBATID MITE FROM ETHIOPIA (ACARI: ORIBATIDA: CALOPPIIDAE)

S. G. Ermilov^{1*}, E. A. Sidorchuk², L. B. Rybalov³

¹Center of Independent Examinations-NN, Nizhniy Novgorod 603107, Russia;
e-mail: ErmilovAcari@yandex.ru

²Paleontological Institute, Russian Academy of Sciences, Moscow 117997, Russia

³Institute of Ecological and Evolutionary Problems, Russian Academy of Sciences, Moscow 117071, Russia

ABSTRACT: The oribatid mite genus *Zetorchella* (Acari: Oribatida: Caloppiidae) comprises 16 species. We describe *Zetorchella nortoni* sp. n., collected in mosses on trees from Ethiopia. The new species is most similar to *Zetorchella orbiculata* Wen, Zhao, 1994 (Asia, China), but differs from this species by the length of the body, the morphology of sensilli, the length of interlamellar setae, and the morphology of notogastral setae p_2 and p_3 . Among African species the new species is most similar to *Zetorchella basylewskyi* (Balogh, 1958), but differs from this species by body size, the length of interlamellar setae and setae c , and the morphology of notogastral setae.

KEY WORDS: oribatid mite, new species, Caloppiidae, *Zetorchella nortoni* sp. n., Ethiopia

INTRODUCTION

The pantropical family Caloppiidae (Acari, Oribatida) includes 4 genera and 22 species (Subías 2009). *Zetorchella* Berlese, 1916 is the largest genus of Caloppiidae Balogh, 1960. The genus was proposed by Pearce (1906) as *Chaunoproctus* with *Chaunoproctus cancellatus* (Pearce, 1906) as type species; *Caloppia* Balogh, 1958, *Pabulozetes* Tseng, 1952 and *Zetorchella* Berlese, 1916 were considered junior synonyms (Subías 2004). However as the name *Chaunoproctus* is preoccupied, the genus name is *Zetorchella* (Subías 2008). Currently, the genus comprises 16 named species, and most of these have restricted geographical distributions (i.e., are found only in one of the Asian or African countries).

Five species of the genus *Zetorchella* are known from Africa: *Zetorchella basylewskyi* (Balogh, 1958) (Distribution: Congo), *Z. longipilosa* (Mahunka, 1974) (Zimbabwe), *Z. minor* (Balogh, 1958) (Angola), *Z. pedestris* Berlese, 1916 (Tropical Africa), *Z. vargai* (Balogh, 1959) (Tanzania) (Subías, 2009). Distinctive morphological characters of African species of *Zetorchella* were given in the keys of Balogh and Balogh (2002). In the present work, we propose and describe a new species of *Zetorchella* collected from Ethiopia, based on adult specimens.

MATERIALS AND METHODS

Material: three specimens (females). The locality and habitat characterization of the new species are given in the “Material examined” section.

Specimens 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 for holotype and

paratypes (in parentheses). Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the ventral plate, to avoid discrepancies caused by different degrees of notogastral distension. Notogastral width refers to the maximum width in dorsal aspect. Length of body setae was measured in lateral aspect. The second paratype was dissected for detailed studies (in particular, gnathosoma, legs).

Formulas for leg setation are given according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formulas for leg solenidia are given according to the sequence genu–tibia–tarsus, for each leg.

Family Caloppiidae Balogh, 1960

Genus *Zetorchella* Berlese, 1916

Zetorchella nortoni Ermilov, Sidorchuk, Rybalov sp. n.

Figs. 1–18

Diagnosis. With character states of *Zetorchella* as proposed by Pearce (1906), and summarized by Balogh and Mahunka (1984) and Balogh and Balogh (1992). The new species is recognized by the large body size (713–813 × 514–564); long (139–155), setiform, barbed rostral setae (ro); long (168–184, 217–225, respectively), thickish, barbed lamellar (le) and interlamellar setae (in); sensilli (ss ; 114–135) with barbed oblong, clavate head and long stalk; medium sized, rather thick, barbed notogastral setae (except slightly shorter c and distinctly shorter and thinner p_2 and p_3).

Measurements and form of body. Large species. Body length 713 (780, 813), width of notogaster 514 (564, 564). Body egg shaped in dorsal view, typical of *Zetorchella*.

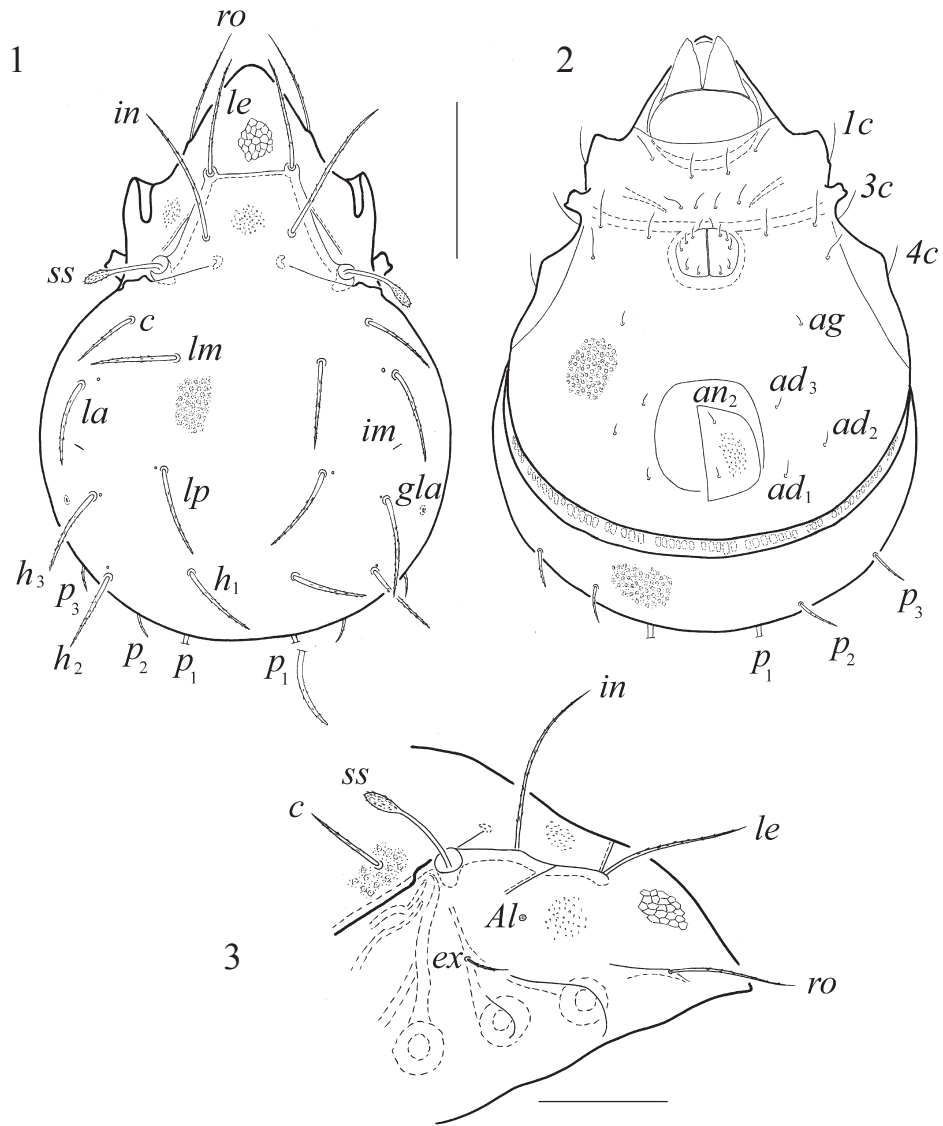


Fig. 1-3. *Zetorchella nortoni* sp.n. 1 — dorsal view, 2 — ventral view, legs removed, 3 — lateral view of prodorsum, legs removed. Scale bar (1, 2) 200 μ m, scale bar (3) 100 μ m.

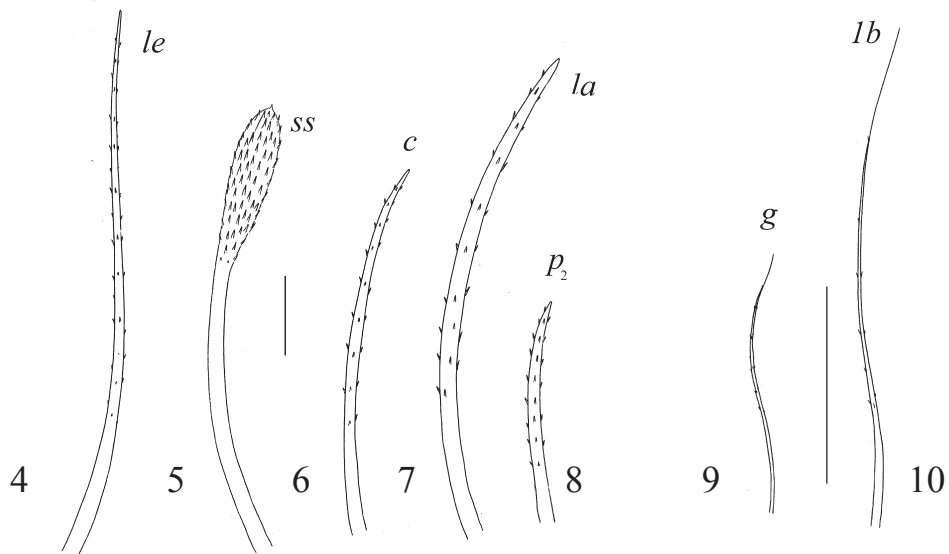


Fig. 4-10. *Zetorchella nortoni* sp. n. setae. 4 — lamellar seta, 5 — sensillus, 6 — notogastral seta *c*, 7 — notogastral seta *la*, 8 — notogastral seta *p*₂, 9 — genital seta, 10 — epimeral seta *lb*. Scale bar 20 μ m, the following groups to same scale: 4-8, 9-10.

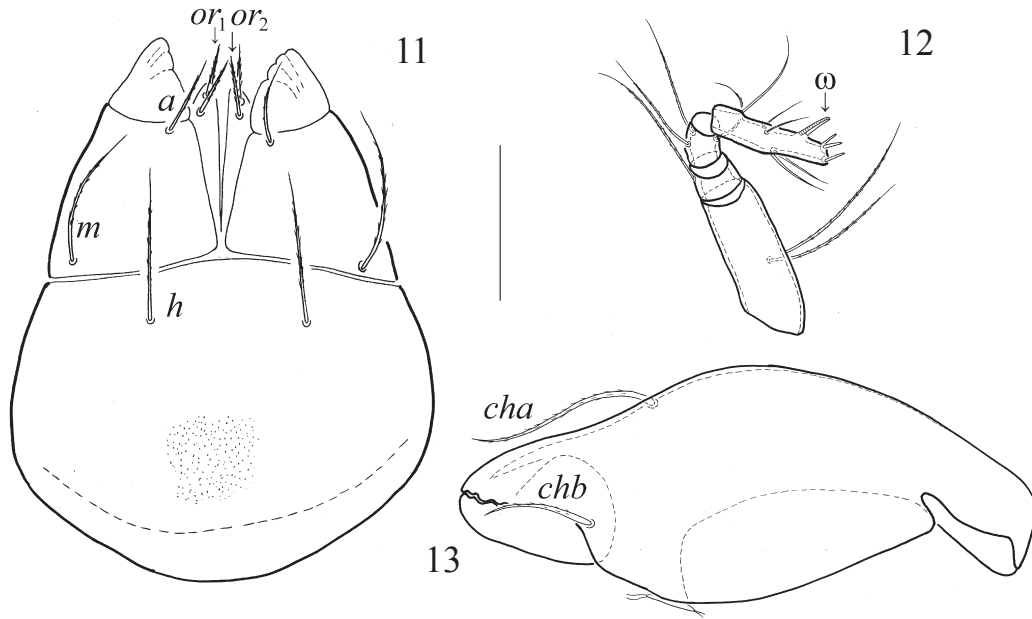


Fig. 11–13. *Zetorchella nortoni* sp. n. 11 — subcapitulum, 12 — palp, 13 — chelicera. Scale bar 50 μ m.

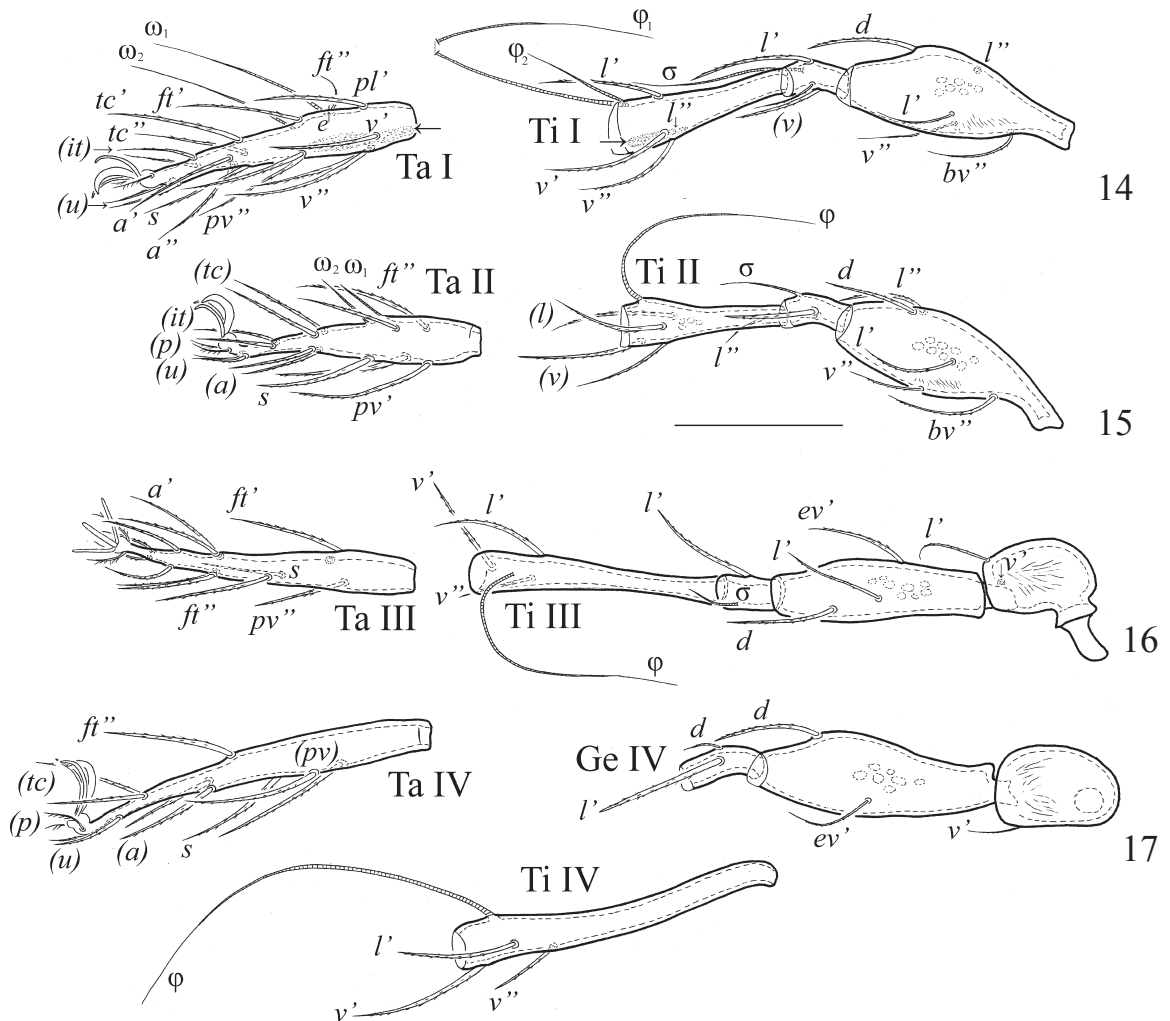


Fig. 14–17. *Zetorchella nortoni* sp. n. 14 — leg I, without trochanter, right, paraxial view, 15 — leg II, without trochanter, right, paraxial view, 16 — leg III, left, dorsal view, 17 — leg IV, right, antiaxial view; Ta, Ti, Ge — tarsi, tibiae, genua, accordingly. Scale bar 100 μ m.

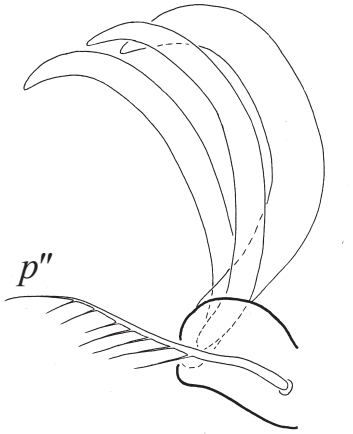


Fig. 18. *Zetorchella nortoni* sp. n. 18 — claws and seta p'' of leg II. Scale bar 20 μ m.

Integument. Body color dark brown. Surface of body with thin, granular cerotegument. Surface between rostrum and translamella with polygonal sculpture. Surface between translamella and lamellae and surface of lateral sides of body microtuberculate. Surface of notogaster and ventral plate irregularly foveate. Foveae oval or round, with diameters of 8–12. Femora (sometimes tibiae) of legs with rare foveae.

Prodorsum and lateral part of body (Figs. 1–5). Rostrum conical, rounded in dorsal aspect. Lamellae 131 (131, 131) in length, weakly converging, located dorsally. Lamellar cusps well developed, short 12 (16, 16), wide. Translamella 82 (94, –) in length, narrow, 6 (6, –) in width, straight. Sublamellae weakly developed. Lateral part of prodorsum with thin, slightly bent tutorium. Tutorium with hardly appreciable dorso-distal tubercle on which rostral seta sits. Sublamellar areae porosae (Al) visible (with diameter of 8). Rostral setae 139 (151, 155) in length, setiform, barbed, located laterally on tutorium. Lamellar and interlamellar setae longer and thicker than rostral setae, barbed (Fig. 4). Lamellar setae 168 (176, 184) in length, located on lamellar cusps. Interlamellar setae longest, 217 (225, 225), located between lamellae. Sensilli 114 (135, 131) with barbed oblong clavate head (36 (53, 49) in length) and long stalk (78 (82, 82)) (Fig. 5). Bothridia funnel-shaped, with large opening. Exobothridial setae rather short, 45 (49, 49) in length, setiform, barbed. Large pedotecta 1 and small pedotecta 2 well developed.

Notogaster (Figs. 1–2). Almost round in dorsal view. Dorsosejugal scissure interrupted medially. Humeral regions with small projection. Ten pairs of notogastral setae: setae la , lm , lp , h_1 – h_3 , p_1 approximately identical length, 127–135 (139–145,

127–135), straight or weakly curled, rather thick, barbed; setae c slightly shorter, 98 (118, 110) (Figs. 6, 7); setae p_2 , p_3 much shorter, 61 (65, 69), thinner (Fig. 8). Five pairs of very small notogastral pores located in normal position for *Zetorchella* (adjacent to setae la , lp , h_2 , h_3 , p_1 , respectively). Anterior pore (adjacent to setae la) slightly larger than others. Only lyrifissure im well developed; other lyrifissures not observed. Opisthosomal gland opening (gla) located dorsolaterally at level of setae h_3 .

Anogenital region. All anogenital setae thin, setiform, with little difference in length, 24–28 (24–28, 28–32). Anal and adanal setae weakly barbed, aggenital and genital setae well barbed (Fig. 9). Lyrifissures iad not observed.

Epimeral region. Apodemes $ap2$, $apsj$ and circumpedal carina developed; apodemes $ap2$ short, apodeme $apsj$ complete. Epimeral setal formula 3–1–3–3; setae long, thin, barbed (Fig. 10). Setae $1c$, $3c$, $4c$ located laterally.

Gnathosoma (Figs. 11–13). Subcapitulum longer than wide: 180 \times 147. Subcapitular mentum wider than long. Hypostomal setae a (57) and m (61) long, setiform, barbed; setae h (28) shorter, barbed. Lateral lips with 2 pairs of short (20), thickish, straight, barbed adoral setae (or_1 , or_2) (Fig. 11). Palp (length 131) with setation 0–2–1–3–9(+1 ω). All setae (except palptarsal) long, setiform, barbed. Palpal eupathidium acm and solenidium ω attached in double horn (Fig. 12). Chelicera (length 192) with few blunt teeth on fixed and movable digits. Cheliceral setae long, setiform, barbed: cha (69) longer than chb (45) (Fig. 13).

Legs (Figs. 14–18). Legs long, but shorter than body. Length of legs (second paratype): I 531, II 514, III 597, IV 747. Tarsi, tibiae and femora elongated; genua short; trochanters I, II small, and III, IV rather large. Porose areas distoventrally on tibiae and proximoventrally on tarsi only (Fig. 14). All legs tridactylous with stronger median and slender lateral claws (Fig. 18). Formula of leg setation and solenidia: I (1–5–3–4–20) [1–2–2], II (1–5–2–4–15) [1–1–2], III (2–3–1–3–15) [1–1–0], IV (1–2–2–3–12) [0–1–0]; homology of setae and solenidia indicated in Table 1. Setae well barbed; setae p of all legs with long ciliae on one side (Fig. 18). Famulus small. All solenidia free. Solenidia ω_1 and ω_2 (tarsi I), φ_2 (tibiae I), σ (genua II, III) setiform; solenidia φ_1 (tibiae I), φ (tibiae II–IV) and σ (genua I–III) very long, flagellate distally; solenidia ω_1 and ω_2 (tarsi II) straight, pointed.

Table.
Leg setation and solenidia of *Zetorchella nortoni* sp. n.*

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

*Roman letters refer to normal setae, Greek letters refer to solenidia, e — famulus. 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.

Material examined. Holotype (female), paratypes (2 females). Specimens were obtained from: Africa, Ethiopia, 8°53'N, 38°09'E, 10 km to the south from Ginchi city, 2900 m above sea level, Cholomu Forest (wood species, in particular, *Hagenia abissinica* and *Podocarpus* forming the canopy; undergrowth of ferns), in mosses on trees, 15.11.2009, coll. L.B. Rybalov.

Type deposition. The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; first paratype *ibid*; second paratype (dissected) is in the personal collection of the first author.

Etymology. The species is named in honor of Prof. Dr. Roy A. Norton (State University of New York, College of Environmental Science and Forestry, Syracuse, USA), the distinguished acarologist.

Differential diagnosis. *Zetorchella nortoni* sp. n. is most similar to *Zetorchella orbiculata* Wen, Zhao, 1994 (distribution: Asia, China), but the latter has smaller body length (668–716), short sensilli with globular clavate head, rostral and lamellar setae longer than interlamellar setae, and phylliform setae p_2, p_3 . Among African species *Zetorchella nortoni* sp. n. is most similar to *Zetorchella basylewskyi* (Balogh, 1958) (distribution: Africa, Congo), but the latter has smaller body size (590–600 × 430–470), shorter interlamellar setae and setae *c*, and thinner notogastral setae.

Distribution. At present, this species is only known from Ethiopia.

ACKNOWLEDGEMENTS

We gratefully acknowledge Dr. Valerie Behan-Pelletier (Systematic Entomology, Agricul-

ture and Agri-Food Canada, K.W. Neatby Building, Ottawa, Canada) for thorough review of this manuscript and many valuable suggestions. We also extend our cordially thanks to Prof. Dr. Roy A. Norton (State University of New York, College of Environmental Science and Forestry, Syracuse, USA) for help with collecting literature, and Dr. Umukusum Shtanchaeva (Caspian Institute of Biological Resources, Makhachkala, Russia) for consultations.

REFERENCES

- Balogh, J. 1958. Oribatides nouvelles de l'Afrique tropicale. *Revue de zoologie et de botanique africaines*, 58: 1–34.
- Balogh, J. and Mahunka, S. 1984. A review of the Oribatuloidea Thor, 1929 (Acari: Oribatei). *Acta Zoologica Hungarica*, 30: 257–313.
- Balogh, J. and Balogh, P. 1992. *The oribatid mites genera of the world*. V. 1. Hungarian National Museum press, 263 pp.
- Balogh, J. and Balogh, P. 2002. *Identification keys to the oribatid mites of the Extra-Holarctic regions*. V. 1. Publisher: Well-Press Publishing Limited, 453 pp.
- Pearce, N.D.F. 1906. On some Oribatidae from the Sikhim Himalaya. *Journal of the Royal Microscopical Society*, 26: 269–273.
- Subías, L.S. 2004. Listado sistemático, sinonímico y biogeográfico de los ácaros oribátidos (Acariformes: Oribatida) del mundo (excepto fósiles). *Graellsia*, 60. (número extraordinario): 3–305. Actualized en mayo de 2008, 540 pp; actualized en abril de 2009, 547 pp. <http://www.ucm.es/info/zoo/Artropodos/Catalogo.pdf>
- Wen, Z. and Zhao, X. 1994. The first investigation on the oribatid mites of the Yunnan province, China (Acari: Oribatida). *Acta Arachnologica Sinica*, 3 (1): 73–80.