SPIXIANA	44	2	237–242	München, December 2021	ISSN 0341-8391

Calozetes schatzi sp. nov. from Peru, with overview of the genus

(Acari, Oribatida, Microzetidae)

Sergey G. Ermilov, Luis S. Subías, Umukusum Ya. Shtanchaeva & Stefan Friedrich

Ermilov, S. G., Subías, L. S., Shtanchaeva, U. Y. & Friedrich, S. 2021. *Calozetes schatzi* sp. nov. from Peru, with overview of the genus (Acari, Oribatida, Microzetidae). Spixiana 44 (2): 237–242.

The genus *Calozetes* (Oribatida, Microzetidae) is recorded in Peruvian fauna for the first time. A new species of *Calozetes* is described from Amazonian Peru, based on materials collected from soil and leaf litter in the primary evergreen lowland rainforest; *C. schatzi* sp. nov. differs from *Calozetes monticola* Balogh & Mahunka, 1969 by the morphology of lamellae, the length of rostral, lamellar and bothridial setae, and the surface of notogaster. The generic diagnosis of *Calozetes* is presented. Data on distribution of *Calozetes* species are summarized.

Sergey G. Ermilov (corresponding author), Institute of Environmental and Agricultural Biology (X-BIO), Tyumen State University, Tyumen, Russia;
e-mail: ermilovacari@yandex.ru

Luis S. Subías, Complutense University, Madrid, Spain;
e-mail subias@bio.ucm.es

Umukusum Ya. Shtanchaeva, Complutense University, Madrid, Spain;
e-mail: umukusum@mail.ru

Stefan Friedrich, SNSB-Bavarian State Collection of Zoology, Munich, Germany;
e-mail: friedrich@snsb.de

Introduction

Calozetes (Acari, Oribatida) is a monotypic genus of the family Microzetidae, which was proposed by Balogh & Mahunka (1969) with *Calozetes monticola* Balogh & Mahunka, 1969 as type species from Bolivia. During taxonomic identification of microzetid oribatid mites from Peru, we found one new species belonging to *Calozetes*. The main goals of our paper are: to describe and illustrate this species, to revise the generic diagnosis of *Calozetes* and to summarize data on distribution of *Calozetes* species.

Until now, a few species number of Microzetidae have been registered in Peruvian fauna (e. g. Hammer 1961, Balogh 1962, Ermilov & Friedrich 2017).

Methods

Observation and documentation

Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the notogaster. Body width refers to the maximum width of the ventral plate in ventral view. Lengths of body setae were measured in lateral aspect. All body measurements are presented in micrometers. Formulas for leg setation are given in parentheses according to the sequence trochanter-femur-genu-tibia-tarsus (famulus included). Formulas for leg solenidia are given in square brackets according to the sequence genu-tibia-tarsus. Drawings were made with a camera lucida using a Leica transmission light microscope “Leica DM 2500”.

Terminology

Morphological terminology used in this paper follows that of F. Grandjean: see Travé & Vachon (1975) for references, Norton (1977) for leg setal nomenclature, and Norton & Behan-Pelletier (2009), for overview.

Abbreviations

Prodorsum: *lam* = lamella; *tlam* = translamella; *tu* = tutorium; *gt* = genal tooth; *ro*, *le*, *in*, *bs*, *ex* = rostral, lamellar, interlamellar, bothridial, and exobothridial seta, respectively. Notogaster: *c*, *la*, *lm*, *lp*, *h*, *p* = setae; *im*, *ip*, *ih*, *ips* = lyrifissures; *gla* = opisthonotal gland opening. Gnathosoma: *a*, *m*, *h* = subcapitular setae; *or* = adoral seta; *d*, *l*, *sup*, *inf*, *cm*, *ul*, *su*, *vt*, *lt* = palp setae; ω = palp solenidion; *cha*, *chb* = cheliceral setae; *Tg* = Trägårdh's organ. Epimeral and lateral podosomal regions: *1a-c*, *2a*, *3a-c*, *4a-c* = epimeral setae; *PdI*, *PdII* = pedotectum I, II, respectively; *cus* = custodium; *dis* = discidium; *cp* = circumpedal carina. Anogenital region: *g*, *ag*, *an*, *ad* = genital, aggenital, anal, and adanal seta, respectively; *iad* = adanal lyrifissure; *po* = preanal organ. Legs: *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = trochanter, femur, genu, tibia, tarsus, respectively; *pa* = porose area; ω, φ, σ = solenidia; ε = famulus; *d*, *l*, *v*, *bv*, *ev*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl* = setae.

Taxonomy

Family Microzetidae
Genus *Calozetes* Balogh & Mahunka, 1969
Type species: *Calozetes monticola*
Balogh & Mahunka, 1969

Generic diagnosis (adult). With character states of Microzetidae (Grandjean 1936; Norton & Behan-Pelletier 2009).

Body size: Very small (length less than 300).

Integument: Surface of lamella striate. Notogaster with or without cerotegumental bands.

Prodorsum: Rostrum rounded or concave. Lamellae of medium length (distinctly not reaching rostrum; anterior part of prodorsum open in dorsal aspect), connected medially and fused mediobasally by short translamella (median tubercle absent); lamellar cusps large, connected or slightly divergent mediodistally, rounded distally or with outer tooth. Interlamellar region represented by trapezoid opening. Lobed structure absent. Tutorium present. Genal tooth well developed. Rostral and lamellar setae setiform; *ro* inserted dorsally on prodorsum, *le* in distal part of lamellar cusp. Interlamellar seta short, setiform, inserted on lamella. Bothridial seta clavate, directed lateral and upward.

Notogaster: Anterior notogastral margin slightly convex medially. Pteromorph small. Ten pairs of notogastral setae short, setiform.

Gnathosoma: Subcapitulum diarthric; all subcapitular setae setiform. Palp with setation: 0-2-1-3-9 (+ ω); solenidion bacilliform, comparatively short. Axillary saccule not observed. Chelicera chelate-dentate.

Epimeral and lateral podosomal regions: Epimeral setal formula: 3-1-3-3; all setae comparatively short, setiform. Circumpedal carina and discidium present.

Anogenital region: Six pairs of genital, one pair of aggenital, two pairs of anal, and three pairs of adanal setae comparatively short, setiform. Adanal lyrifissure located close and lateral to anal plate.

Legs: All legs monodactylous. Porose area present on all femora and on trochanters III, IV.

Calozetes schatzi sp. nov.

Figs 1-3

Diagnosis. Body size: 237–246 × 155–159. Lamella, pedotectum I and anterior part of pteromorph striate; basal part of pteromorph tuberculate. Rostrum concave medially. Lamella distally rounded; their inner margins parallel, located close to each other, fused mediobasally by simple translamella. Rostral and lamellar setae of medium length, setiform, roughened. Interlamellar, notogastral, epimeral, and genital (except g_1) setae short setiform, thin, smooth; g_1 barbed. Bothridial seta long, clavate, barbed.

Description

Measurements. Body length: 237 (holotype, female), 246 (one paratype, one male); notogaster width: 155 (holotype), 159 (one paratype).

Integument. Body colour brown. Surface of body and legs mostly smooth. Lamella and dorsolateral side of pedotectum I with strong longitudinal stria. Anterior part of pteromorph and ventral side of pedotectum I slightly striate. Basal part of pteromorph partially tuberculate (diameter of tubercle up to 4).

Prodorsum. Rostrum concave medially. Lamella distally rounded. Inner margins of lamellae parallel, located close to each other, with narrowly elongate gap before translamella. Rostral (32) and lamellar (41) setae setiform, roughened; *le* inserted ventrodistally on lamella. Interlamellar seta (6) setiform, thin, smooth. Bothridial seta (53-61) clavate, with long stalk and short, oval, slightly barbed head. Exobothridial seta (16) setiform, roughened. Tutorial tip broad, with one or two poorly visible teeth. Genal tooth long, reaching rostrum, narrowly triangular.

Notogaster. Pteromorph rounded laterally. All notogastral setae (8) setiform, thin, smooth. Notogas-

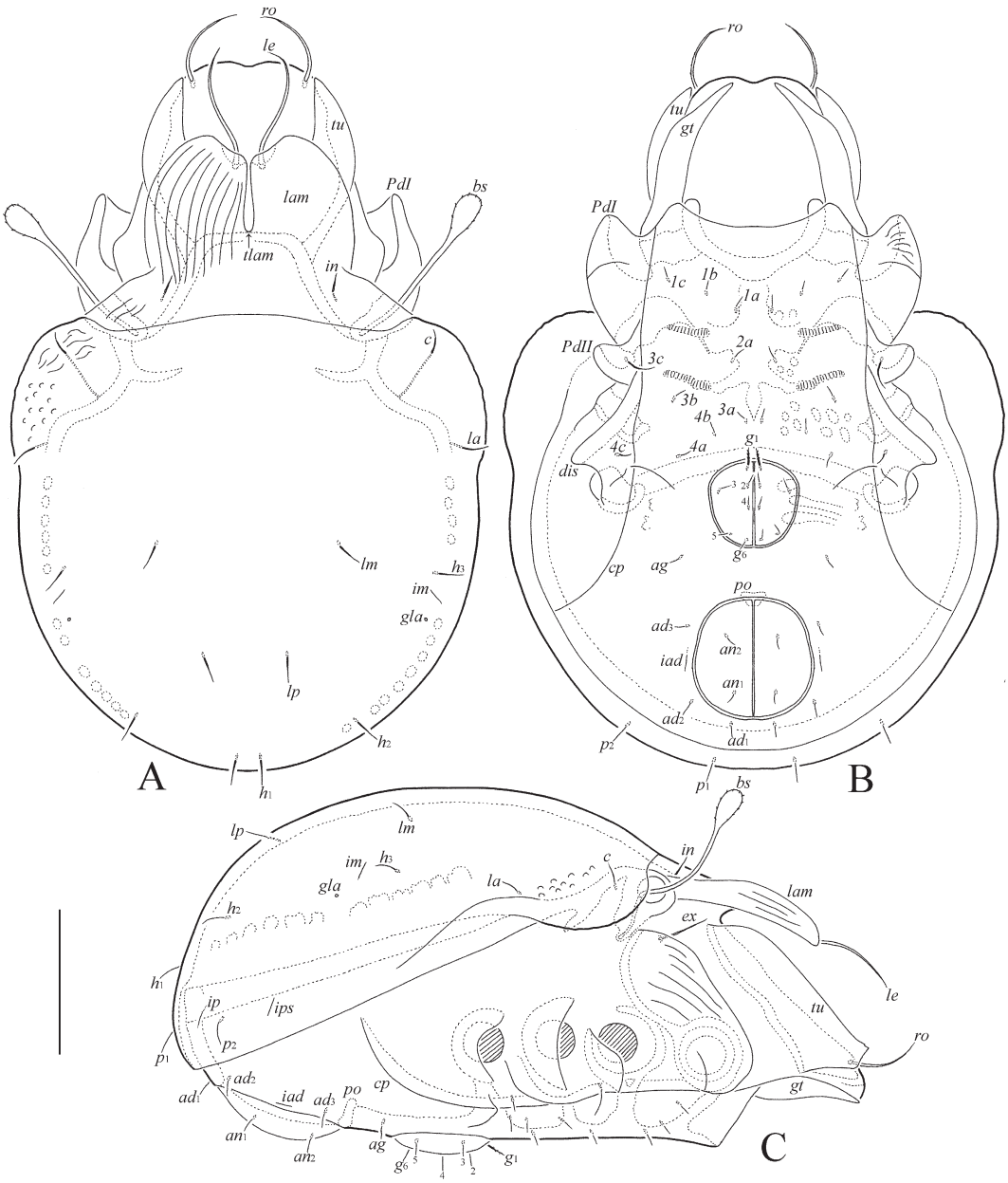

Fig. 1. *Calozetes schatzi* sp. nov., adult: **A.** dorsal view; **B.** ventral view (not shown: gnathosoma and legs); **C.** lateral view (not shown: gnathosoma and legs). Scale bar 50 µm.

tral lyrifissures *ia* and *ih* not observed; *im*, *ip* and *ips* visible. Opisthonotal gland opening distinct.

Gnathosoma. Subcapitulum size: 53–57 × 45. All subcapitular setae (*a*: 16; *m*: 12; *h*: 8) setiform, slightly barbed; *a* thickest, *h* thinnest. Adoral seta (4) setiform, thin, smooth. Palp (length: 41) with typical setation: 0-2-1-3-9 (+ ω). Postpalpal seta (4) spiniform, smooth. Chelicera (length: 53–57) with poorly developed teeth on digits and two setiform, barbed setae (*cha*: 20; *chb*: 12).

Epimeral and lateral podosomal regions. All epimeral setae (*3c*: 10; others: 6) setiform, thin,

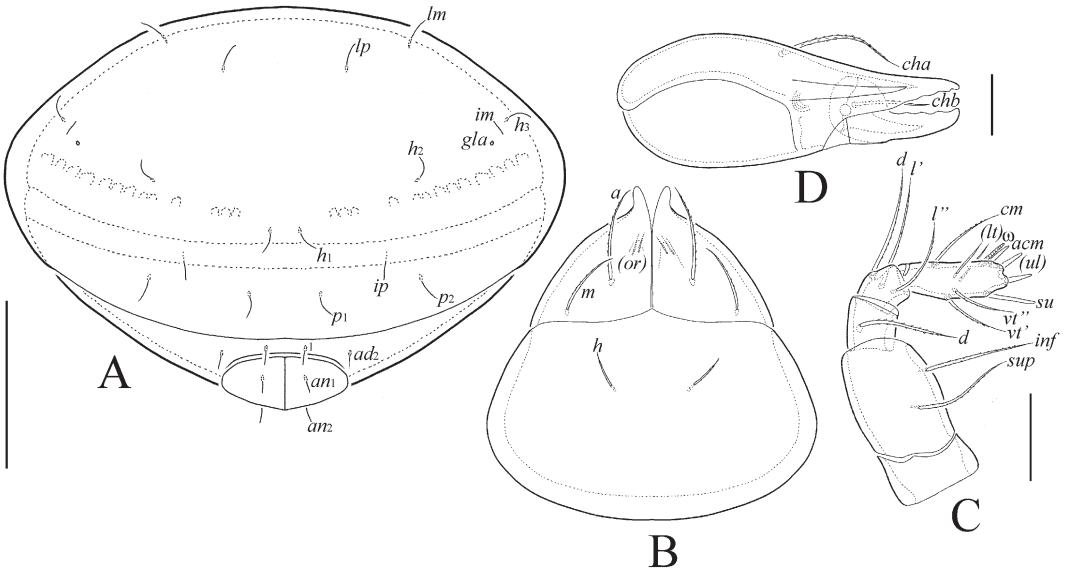

Fig. 2. *Calozetes schatzi* sp. nov., adult: **A.** posterior view; **B.** subcapitulum, ventral view; **C.** palp, right, antiaxial view; **D.** chelicera, left, paraxial view. Scale bar 50 µm (A), 10 µm (B–D).

smooth. Discidium elongate triangular. Circumpedal carina strong, directed to pedotectum II.

Anogenital region. Genital (except g_1), aggenital, anal, and adanal setae (6) setiform, thin, smooth; g_1 (8) setiform, barbed. Adanal lyrifissure distinct.

Legs. Claw of each leg sparsely barbed dorsally. Paraxial porose area on femora I-IV and on trochanters III, IV distinct. Formulas of leg setation and solenidia: I (1-5-3-4-19) [1-2-2], II (1-5-3-4-15) [1-1-2], III (2-3-2-3-15) [1-1-0], IV (1-2-2-3-12) [0-1-0]; homologies of setae and solenidia indicated in Table 1. Famulus of tarsus I short, erect, slightly swollen distally, inserted between solenidion ω_1 and seta *ft''*.

Material examined. Holotype (male) and one paratype (male): South America, Amazonian Peru, 09°37' S, 74°56' W, Huánuco Department, Puerto Inca Province, Yuyapichis District, Área de Conservación Privada, Panguana (biological field station), near Rio Yuyapichis (river), 230–260 m a. s. l., upper soil and leaf litter in the primary evergreen lowland rainforest, 23.IV.2016-09.V.2016 (leg. S. Friedrich, F. Wachtel and D. Hauth). Mites were extracted from samples into 75 % ethanol using Winkler's apparatus under laboratory conditions.

Type deposition. The holotype is deposited in the collection of the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru; one paratype is deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia. All type material in ethanol with a drop of glycerol.

Etymology. The specific name is dedicated to our friend and colleague, the well-known acarologist Dr. Heinrich Schatz (Institute of Ecology, Leopold-Franzens-University, Innsbruck, Austria), for his extensive taxonomic and faunistical studies of oribatid mites.

Table 1. Leg setation and solenidia of *Calozetes schatzi* sp. nov. Roman letters refer to normal setae, Greek letters to solenidia (except ε = famulus); single quotation mark (') designates setae on the anterior and double quotation mark (") setae on the posterior side of a given leg segment; parentheses refer to a pair of setae.

Leg	*Tr*	*Fe*	*Ge*	*Ti*	*Ta*
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'*, ε, ω_1, ω_2
II	*v'*	*d*, (*l*), *bv''*, *v''*	(*l*), *v'*, 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	*ft''*, (*tc*), (*p*), (*u*), (*a*), *s*, (*pv*)

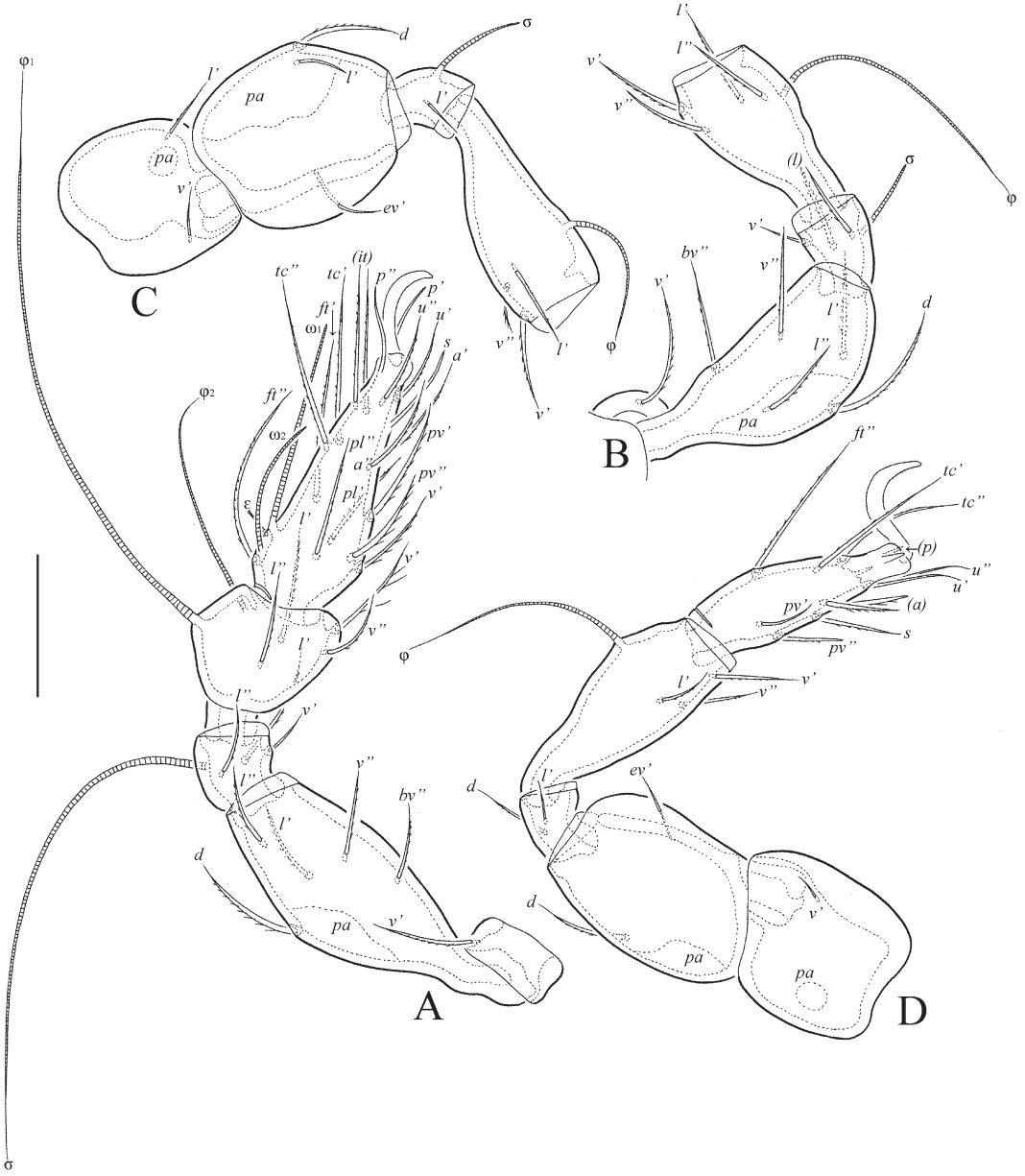

Fig. 3. *Calozetes schatzi* sp. nov., adult: **A.** leg I, right, antiaxial view; **B**. leg II (without tarsus), left, antiaxial view; **C.** leg III (without tarsus), left, antiaxial view; **D.** leg IV, left, antiaxial view. Scale bar 20 µm.

Remarks. *Calozetes schatzi* sp. nov. differs from the type species – *Calozetes monticola* Balogh & Mahunka, 1969 – by the close localization (versus distinctly separated) of mediodistal parts of lamellae, longer (versus shorter) rostral, lamellar and bothridial setae, rounded (versus with outer tooth) anterolateral part of lamella, and the absence (versus presence) of cerotegumental notogastral ridges.

Distribution of *Calozetes*. Both known species of *Calozetes* are recorded only from type localities in the Neotropical region. The type species, *C. monticola* was described from Bolivia: in wet litter at base of shrubs in valley of Rio Abaho (La Paz), 15 km from

La Paz, about 3200 m a. s. l. (Balogh & Mahunka 1969). The new species, *Calozetes schatzi* sp. nov. was collected from Peru: in upper soil and leaf litter in the primary evergreen lowland rainforest in Huánuco, Puerto Inca, Yuyapichis, Área de Conservación Privada, Panguana, near Rio Yuyapichis, 230–260 m a. s. l. (data of this paper).

Acknowledgements

We thank Dr. Juliane Diller and Erich Diller for kindly inviting S. Friedrich to Panguana; Franz Wachtel (Grünwald, Germany) and David Hauth (Fürstenfeldbruck and Marburg, Germany) for expertise and assistance in the field; Dr. Gerardo Lamas Müller and Dra. Diana Silva Dávila (both Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru) for cooperation; and the Servicio Nacional Forestal y de Fauna Silvestre (SERFOR) for issuing a collecting permit (# 007-2014-SERFOR-DGGSPFFS) and export permit (# 003052-SERFOR). This research was supported by the cooperative agreement No. FEWZ-2021-0004 from the Russian Ministry of Science and Higher Education.

References

Balogh, J. 1962. New microzetids from Eastern Peru (Acari, Oribatei). Annales Historico-Naturales Musei Nationalis Hungarici, 54: 405–417.

– – & Mahunka, S. 1969. The scientific results of the Hungarian soil zoological expeditions to South America. 12. Acari: Oribatids from the materials of the second expedition. III. Acta Zoologica Academiae Scientiarum Hungaricae 15 (3–4): 255-275.

Ermilov, S. G. & Friedrich, S. 2017. Additions to the knowledge of the oribatid mite genus *Kalyptrazetes* (Acari, Oribatida, Microzetidae). Systematic & Applied Acarology 22 (3): 333–340.

Grandjean, F. 1936. Les Microzetidae n. fam. (Oribates). Bulletin de la Société Zoologique de France 61: 60–93.

Hammer, M. 1961. Investigations on the oribatid fauna of the Andes Mountains. II. Peru. Det Kongelige Danske Videnskabernes Selskab Biologiske Skrifter 13 (1): 1–157.

Norton, R. A. 1977. A review of F. Grandjean's system of leg chaetotaxy in the Oribatei (Acari) and its application to the family Damaeidae. Pp. 33–61 in: Dindal, D. L. (ed.). Biology of oribatid mites. Syracuse (SUNY College of Environmental Science and Forestry).

– – & Behan-Pelletier, V. M. 2009. Suborder Oribatida. Chapter 15. Pp. 430–564 in: Krantz, G. W. & Walter, D. E. (eds). A manual of acarology. Lubbock (Texas Tech University Press).

Travé, J. & Vachon, M. 1975. François Grandjean 1882-1975 (Notice biographique et bibliographique). Acarologia 17 (1): 1–19.