



First record of the genus *Flagellozetes* (Acari, Oribatida, Galumnidae) from Brazil, with description of a new species

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ABSTRACT

The genus *Flagellozetes* (Oribatida, Galumnidae) is recorded for the first time from Brazil. A new species, *F. (Cosmogalumna) tocantinsensis* **sp. nov.**, is described based on adults collected from litter in a flooded secondary tropical forest.

KEYWORDS

Brazilian fauna, morphology, Neotropical region, oribatid mites, taxonomy

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INTRODUCTION

Flagellozetes Balogh, 1970 (Acari, Oribatida, Galumnidae) was proposed by Balogh (1970), with *Flagellozetes porosus* Balogh, 1970 as type species. The genus comprises three subgenera and 27 species distributed in the Oriental, Neotropical, and southern Palaearctic regions (Subías 2022; Ermilov 2024, 2025). The generic and subgeneric diagnoses were presented by Ermilov and Klimov (2017). An identification key to the species of *Flagellozetes* was presented by Ermilov and Kalúz (2019) and updated by Ermilov and Corpuz-Raros (2022) and Ermilov (2024). Data on the distribution and habitats of many representatives of *Flagellozetes* were provided by Ermilov and Kalúz (2019).

Among the oribatid mite materials collected from Brazil, one new species of the subgenus *Flagellozetes (Cosmogalumna)* Aoki, 1988 was found. The main goal of the paper is to describe this new species. The oribatid mite fauna of Brazil comprises almost 600 species; representatives of *Flagellozetes* have not been recorded from Brazil prior to the present study (Oliveira *et al.* 2017).

METHODS

For measurement and illustration, specimens were mounted in lactic acid on temporary cavity slides. Total body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the gastronotum. Maximum body width was measured in dorsal aspect. Setae were measured from the side to avoid foreshortening. All measurements are in micrometers (µm). Formulas for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (femulus 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 DM 2500 light microscope. Morphological terminology used in this paper follows that of Grandjean (see Ermilov and Klimov 2017 for overview).



Abbreviations: Prodorsum: L_m = medial part of lamellar line; L_l = lateral part of lamellar line; S = sublamellar line; N = prodorsal leg niche; E , T = lateral ridges of prodorsum; ro , le , in , bs = rostral, lamellar, interlamellar, and bothridial setae, respectively; Ad = dorsosejugal porose area; D = dorsophragma; P = pleurophragma. Notogaster: c , la , lm , lp , b_1 – b_3 , p_1 – p_3 = setal alveoli; Aa , $A1$, $A3$ = porose areas; mp = median pore; ia , im , ip , ib , ips = lyrifissures; gla = opisthonotal gland opening. Gnathosoma: a , m , b = subcapitular setae; or = adoral seta; sup , inf , d , l , cm , acm , ul , su , vt , lt = palp setae; ω = palp solenidion; as = axillary saccule; cha , chb = cheliceral setae; Tg = Trägårdh's organ. Epimeral and lateral podosomal regions: $1a$, $3b$, $3c$, $4a$, $4b$, $4c$ = epimeral setae; $1c$ = epimeral setal alveolus; PdI , $PdII$ = pedotecta I, II, respectively; dis = discidium; cir = circumpedal carina. Anogenital region: g_1 – g_6 , am_1 – am_2 , ad_1 – ad_3 = genital, anal, and adanal setae, respectively; iad = adanal lyrifissure; po = preanal organ; Ap = postanal porose area. Legs: ω , φ , σ = solenidia; e = famulus; d , l , v , bv , ev , ft , tc , it , p , u , a , s , pv , pl = setae; pa = porose area.

RESULTS

TAXONOMY

Family Galumnidae Jacot, 1925

Genus *Flagellozetes* Balogh, 1970

Subgenus *Flagellozetes* (*Cosmogalumna*) Aoki, 1988

Type species: *Cosmogalumna ornata* Aoki, 1988

Flagellozetes (*Cosmogalumna*) *tocantinsensis* sp. nov. (Figs 1–12)

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Type material

Holotype (female) and 10 paratypes (one male and nine females): Brazil, Tocantins State, Parrot's Beak, litter in a flooded secondary tropical forest (collection of the University of Tyumen, Museum of Zoology, Tyumen, Russia).

Type deposition

The holotype is deposited in the collection of the Senckenberg Museum of Natural History, Görlitz, Germany. Ten paratypes are deposited in the collection of the University of Tyumen, Museum of Zoology, Tyumen, Russia. All specimens are preserved in 70% solution of ethanol with a drop of glycerol added.

Diagnosis

Small species, body length 229–277. Body densely and distinctly microporose. Centrodorsal part of notogaster and area between genital and anal plates with few faint neural ridges, occasionally forming incomplete cells. Lamellar line bifurcated; both parts (medial and lateral) fused only at their distal ends. Lamellar and sublamellar lines convergent in distal halves, running close to each other distally. Rostral and lamellar setae setiform, roughened. Interlamellar seta acicular. Relative length $ro > le > in$. Bothridial seta long, clavate, barbed. Dorsosejugal porose area, median pore, and postanal elongate porose area present. Three pairs of porose areas circular; $A2$ absent. Epimeral setal formula 2–0–2–3. Aggenital setae absent. Leg famulus inserted close and posterolateral to solenidion ω_1 . Leg solenidion of tibia IV inserted on anterior part of dorsal side of segment, close to its midpoint.

Description

Measurements – Body length 255 (holotype), 229 (male paratype), 240–277 (female paratypes). Notogaster width 184 (holotype), 165 (male paratype), 169–191 (female paratypes).



FLAGELLOZETES (COSMOGALUMNA) FROM BRAZIL

Figures 5–12. *Flagellozetes (Cosmogalumna) tocatinsensis* sp. nov. (adult) – **5.** Prodorsum (lateral parts omitted), dorsoanterior view; **6.** Subcapitulum, ventral view; **7.** Palp, right, antiaxial view; **8.** Chelicera, right, antiaxial view; **9.** Leg I (trochanter omitted), right, antiaxial view; **10.** Leg II (trochanter omitted), right, antiaxial view; **11.** Leg III, left, antiaxial view; **12.** Leg IV, left, antiaxial view.

Gnathosoma – Subcapitulum size $52\text{--}56 \times 45\text{--}49$. Three pairs of subcapitular setae (a 11; m , b 7) setiform, thin, nearly smooth; b thinner than a and m . Two pairs of adoral setae (4) setiform, thin, roughened. Chelicera length 64–67. Cheliceral setae (cha 19–22; chb 13–15) setiform, barbed. Palp length 49–52. Palp setal formula 0–2–1–3–9(+1 ω). Postpalpal seta (4) spiniform.

Epimeral and lateral podosomal regions – Epimeral setal formula 2–0–2–3. Setae $3b$, $3c$, $4c$ (11), $1a$, $4a$, $4b$ (5) setiform, thin, smooth. Seta $1c$ represented by alveolus. Circumpedal carina long, directed to pedotectum I.

Anogenital region – Anogenital setal formula 6–0–2–3. Genital (g_1 , g_2 5–7; g_3 – g_6 2), anal (2–4), and adanal (2–4) setae acicular. Aggenital setae absent. Adanal setae ad_1 and ad_2 posterior, ad_3 lateral to anal plate. Distance ad_1 – ad_2 shorter than ad_2 – ad_3 . Adanal lyrifissure located close and parallel to anal plate. Postanal porose area elongate oval ($19\text{--}26 \times 6$).

Legs – Median claw thicker than lateral claws. All claws nearly smooth. Porose area on femora I–IV and on trochanters III, IV slightly visible. Proximoventral porose area on all tarsi and distoventral porose area on all tibiae absent. Formulas 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. Famulus straight, inserted close and posterolateral to solenidion ω_1 . Seta s of tarsus I eupathidial. Solenidion of tibia IV inserted in anterior part of dorsal side of segment, close to middle.

Table 1. Leg setation and solenidia of adult *Flagellozetes* (*Cosmogalumna*) *tocantinsensis* **sp. nov.**

Leg	Tr	Fe	Ge	Ti	Ta
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	ft'' , (tc), (p), (u), (a), s , (pv)

Note: *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = trochanter, femur, genu, tibia, and tarsus, respectively. Roman letters refer to normal setae, Greek letters to solenidia, e = famulus. Single prime (') marks setae on the anterior and double prime (") setae on the posterior side of a given leg segment. Parentheses refer to a pair of setae.

Remarks

Flagellozetes (*C.*) *tocantinsensis* **sp. nov.** is similar to *F. (C.) ekaterinae* (Ermilov and Friedrich 2016) from Peru (Ermilov and Friedrich 2016) in the following characters: presence of neural ridges on the notogaster and in the aggenital region; having three pairs of notogastral porose areas, a median pore, and a postanal porose area; the location of setal alveolus c behind alary furrow; lacking aggenital setae. However, *F. (C.) tocantinsensis* **sp. nov.** differs from *F. (C.) ekaterinae* in the morphology of the bothridial seta (clavate, barbed, erect vs. fusiform, distally truncate, smooth, directed laterad); the absence (vs. presence) of neural ridges on the pteromorph and the anterior part of the notogaster; a medium-sized (vs. short) lamellar seta; and the position of lamellar and sublamellar lines (convergent at ventral end vs. parallel at ventral end).

Etymology

The specific epithet *tocantinsensis* refers to the Brazilian State of origin, Tocantins.

THE GENUS DISTRIBUTION

Prior to this research, only one species of *Flagellozetes* was known from the Neotropical region: *F. (C.) ekaterinae* from Peru. Thus, *F. (C.) tocantinsensis* sp. n. from Brazil is the second Neotropical species of this genus. The other 26 species of *Flagellozetes* are distributed in the Oriental region (21), Japan (southern Palaearctic region) (3), or simultaneously in both Japan and the Oriental region (2). Furthermore, 16 of the 21 Oriental species are currently considered endemic, with their distribution restricted to single countries: southern China (2), India (1), Indonesia (1), Malaysia (1), Philippines (3), Sri Lanka (1), and Vietnam (7).

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نخستین گزارش از جنس *Flagellozetes* (Acari, Oribatida, Galumnidae) در برزیل، همراه با توصیف گونه‌ای جدید

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چکیده

جنس *Flagellozetes* (Oribatida, Galumnidae) برای نخستین بار از برزیل گزارش می‌شود. گونه جدیدی با نام *F. (Cosmogalumna) tocantinsensis* sp. nov. بر اساس نمونه‌های کامل جمع‌آوری شده از لاشبرگ در جنگل ثانویه گرمسیری دچار آب‌گرفتگی، توصیف شده است.

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