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A new species of *Galumna* (*Galumna*) (Acari, Oribatida, Galumnidae) from Vietnam

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Abstract

Oribatid mite species of the family Galumnidae, *Galumna* (*Galumna*) *parakazakhstani* **sp. nov.**, is described from litter of pine plantation in Dong Nai Culture and Nature Reserve (southern Vietnam). The new species is most similar to *G.* (*G.*) *kazakhstani* Krivolutsкая, 1952, however, it differs from the latter by the body size, morphology of bothridial setae and notogastral porose areas *AI*, development of anterior notogastral margin, and location of medial pore.

Key words: oribatid mite, Galumnidae, *Galumna*, new species, Vietnam.

Introduction

During our taxonomic studies of oribatid mites from Dong Nai Culture and Nature Reserve in southern Vietnam, we found a new species of the genus *Galumna* (Acari, Oribatida, Galumnidae). The main goal of our paper is to describe this species.

The genus *Galumna* was proposed by Heyden (1826) with *Notaspis alatus* Hermann, 1804 (Hermann 1804) as type species. It comprises more than 170 species having a cosmopolitan distribution (data summarized by Subías (2004, updated 2014)). The generic diagnosis and an identification key to known species of *Galumna* in Vietnam have been provided earlier by Ermilov *et al.* (2013) and Ermilov and Anichkin (2014), respectively.

Material and methods

Eight specimens (holotype: female; seven paratypes: six females and one male) of *Galumna* (*Galumna*) *parakazakhstani* **sp. nov.** were collected from southern Vietnam, Dong Nai Province, Dong Nai Culture and Nature Reserve, 11°16'N, 107°40'E, pine plantation (*Pinus kesiya* Royle ex Gordon), litter, 20–21.XII.2013 (A.E. Anichkin and S.G. Ermilov).

Litter was collected by taking 16 samples using a stainless frame (50 × 50 cm) and passed through a sifter (mesh size 2 × 2 cm). The fine fraction was placed in a Winkler extractor with a collection bottle containing 100 ml 75% ethanol. The extractions were conducted at room temperature over 20 days.

Holotype and paratypes were mounted in lactic acid on temporary cavity slides for measurement and illustration. The body length was measured in lateral view, from the tip of the rostrum to the posterior edge

of the ventral plate. The notogastral width refers to the maximum width in dorsal aspect (without pteromorphs). Lengths of body setae were measured in lateral aspect. All body measurements are presented in micrometers. Formula for leg setation is given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formula for leg solenidia is given in square brackets according to the sequence genu–tibia–tarsus. General terminology used in this paper follows that of Grandjean (summarized by Norton and Behan-Pelletier 2009).

The measurements were performed using a computer program ScopePhoto 2.0.

***Galumna (Galumna) parakazakhstani* Ermilov et Anichkin sp. nov.**

(Figures 1–2)

Diagnosis. Body size 647–664 × 448–464. Body surface microfoveolate (visible under high magnification). Rostral, lamellar, interlamellar and bothridial setae setiform. Anterior notogastral margin not developed or indistinctly visible. Four pairs of porose areas present: *Aa* wedge-shaped, other porose areas oval. Genital and aggenital setae smooth, anal and adanal setae barbed. Postanal porose area elongate, thin.

Description

Measurements. Body length: 664 (holotype), 647–664 (seven paratypes: six females and one male); notogaster width: 448 (holotype), 448–464 (seven paratypes).

Integument. Body color brown. Body surface microfoveolate (visible under high magnification in dissected specimens, ×1000). Pteromorphs with weakly developed radiate wrinkles.

Prodorsum. Rostrum widely rounded. Rostral setae (*ro*, 73–82) setiform, barbed unilaterally. Lamellar (*le*, 98–110) and interlamellar (*in*, 110–123) setae longer, setiform, barbed. Bothridial setae (*ss*, 164–172) longest on prodorsum, setiform, thickened, with short cilia unilaterally. Exobothridial setae absent. Lamellar (*L*) and sublamellar (*S*) lines distinct, typical for majority species of *Galumna (Galumna)*: parallel, long, curving backwards. One pair of porose areas *Ad* (41–45 × 6–8) oval, elongate, located postero-laterally to interlamellar setae.

Notogaster. Anterior notogastral margin not developed or indistinctly visible. Dorsophragmata (*D*) of medium size, elongate. Notogastral setae represented by 10 pairs of alveoli. Four pairs of porose areas present: *Aa* (86–90 × 28–36, width measured in broadest part, wedge-shaped, transversely oriented, elongate; *A1* (20–36 × 16–20), *A2* (32–41 × 16–20) and *A3* (32–41 × 16–24) oval, with distinct borders. Right porose area *Aa* divided into two part, lateral triangular and medial oval, in two paratypes. Alveoli of setae *la* inserted posteriorly to *Aa*. Lyrifissures *im* and opisthonotal gland openings (*gla*) located laterally to *A1*. Median pore present, located in posterior part of notogaster below the virtual line connecting *A1*–*A1*.

Gnathosoma. Generally, morphology of subcapitulum, palps and chelicerae typical for most Galumnidae (for example, see Ermilov and Anichkin 2010, 2011; Ermilov *et al.* 2011). Subcapitulum longer than wide (151 × 143). Subcapitular setae setiform, similar in length (28–32); *h* distinctly barbed, *m* and *a* slightly barbed, *m* thinner than other. One pair of adoral setae (*or*₁, *or*₂, 16–20) setiform, barbed, hook-like distally. Palps (118) with setation 0–2–1–3–9(+ω). Solenidion little longer than half of palptarsus length, straight, thickened, blunt-ended, attached to eupathidium. Chelicerae (192) with two barbed setae; *cha* (57) longer than *chb* (32). Trägårdh's organ distinct.

Epimeral and lateral podosomal regions. Apodemes (1, 2, sejugal, 3) well visible. Four pairs of epimeral setae observed ventrally; *3b* (16–20) longer than *1a*, *4a*, *4b* (8–12), all thin, smooth. Discidia (*dis*) triangular, circumpedal carinae (*cp*) distinct.

Anogenital region. Six pairs of genital (*g*₁–*g*₃, 16–20; *g*₄–*g*₆, 8–12) and one pair of aggenital (*ag*, 8–12) setae setiform, thin, smooth. Anterior edge of genital plates with three setae. Two pairs of anal (*an*₁, *an*₂) and three pairs of adanal (*ad*₁–*ad*₃) setae similar in length (16–20), setiform, thicker than genito-aggenital setae, straight, barbed. Adanal setae *ad*₃ inserted laterally to adanal lyrifissures *iad*. Postanal porose area (*Ap*) elongate, thin (98–110 × 6–12).

Legs. Three claws of each leg smooth. Generally, morphology of leg segments, setae and solenidia typical for most Galumnidae (for example, see Ermilov and Anichkin 2010, 2011; 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.

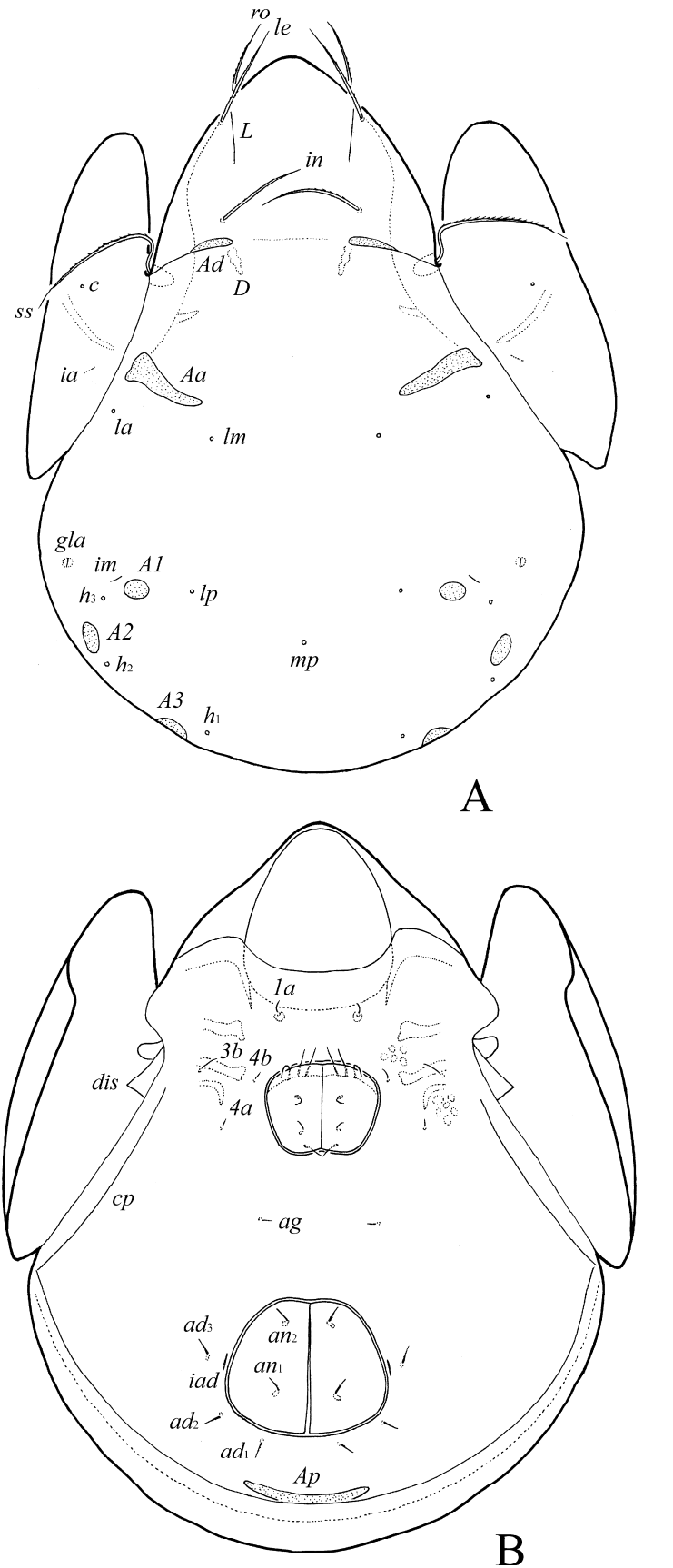


Figure 1. *Galumna (Galumna) parakazakhstan sp. nov.*: **A** — dorsal view; **B** — ventral view (gnathosoma and legs not illustrated). Scale bar 200 µm.

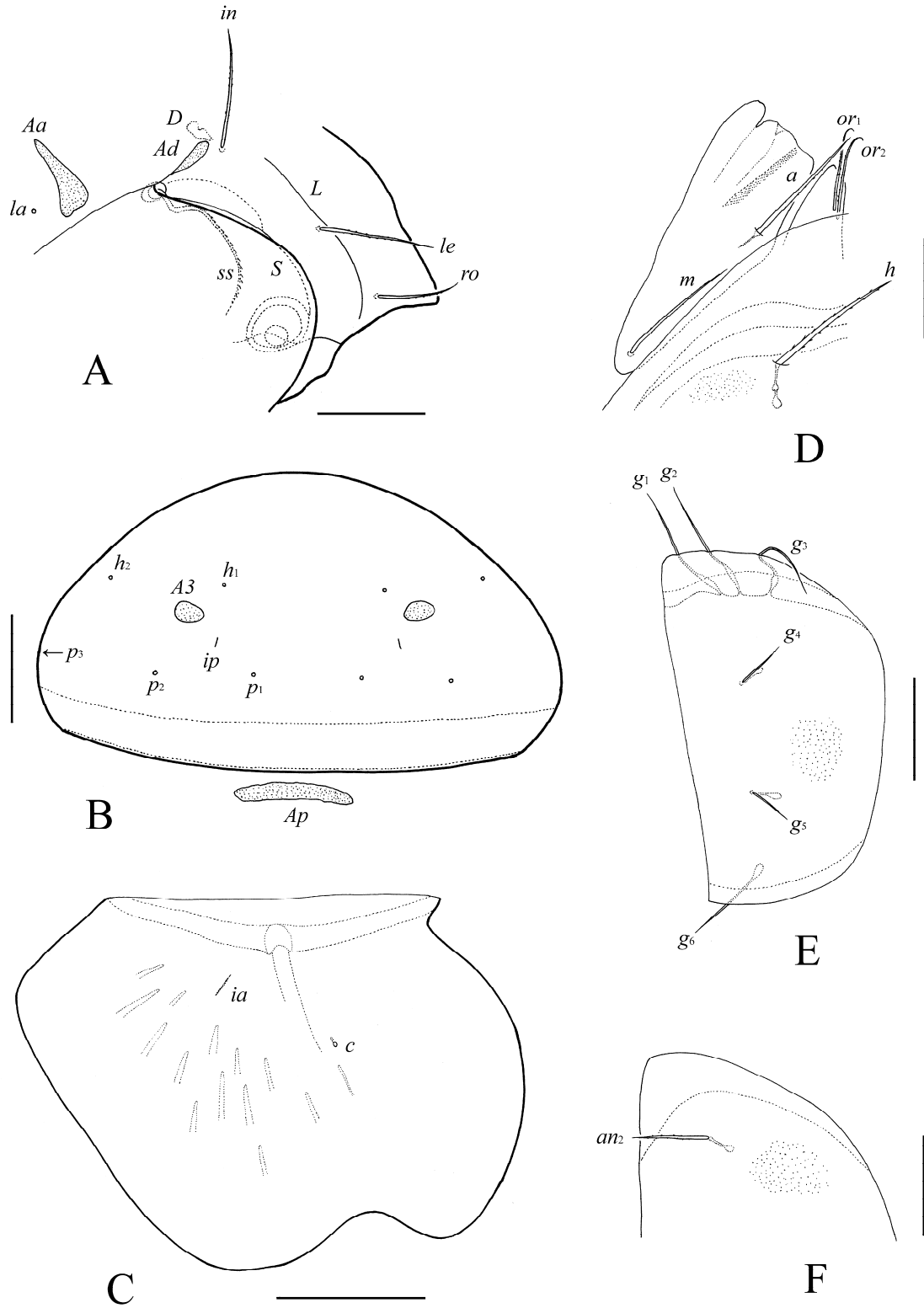


Figure 2. *Galumna (Galumna) parakazakhstan sp. nov.*: **A** — lateral view of prodorsum and anterior part of notogaster (gnathosoma and leg I not illustrated); **B** — posterior view of notogaster; **C** — pteromorph; **D** — anterior part of right half of subcapitulum, ventral view; **E** — left genital plate; **F** — anterior part of left anal plate. Scale bars (A–C) 100 μ m, (D–F) 20 μ m.

Table 1. Leg setation and solenidia of adult *Galumna* (*Galumna*) *parakazakhstani* 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	ft'', (tc), (p), (u), (a), s, (pv)

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

Type deposition. The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; three paratypes are deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia; four paratypes are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Etymology. The prefix *para* is Latin meaning “near” and refers the similarity between the new species and the species *Galumna* (*Galumna*) *kazakhstani* Krivolutskaya, 1952.

Comparison. In having the setiform bothridial setae, well developed interlamellar setae, presence of four pairs of notogastral porose areas, *Galumna* (*Galumna*) *parakazakhstani* sp. nov. is most similar to *Galumna* (*Galumna*) *kazakhstani* Krivolutskaya, 1952 from the southern Palaearctic region. However, the new species clearly differs from the latter by the larger body size (647–664 × 448–464 versus 540 × 420), bothridial setae unilaterally barbed (versus heavily barbed and only in anterior part in *G. (G.) kazakhstani*), anterior notogastral margin absent or indistinctly visible (versus well developed *G. (G.) kazakhstani*), notogastral porose areas *Aa* wedge-shaped, elongate (versus triangular in *G. (G.) kazakhstani*), and medial pore located below than the virtual line connecting porose areas *Al*–*Al* (versus above in *G. (G.) kazakhstani*).

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