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Article

New and Little Known Species of Oribatid Mites (Acari: Oribatida) from Mongolia

Badamdorj BAYARTOGTOKH[1] and Jun-ichi AOKI[2]

モンゴルで採集されたササラダニ類の新種および希少種

バダムドルジ バヤールトグトフ[1]・青木 淳一[2]

Synopsis

In the present paper redescriptions of four known species of oribatid mites: *Oribatella shaldybinae* Rjabinin, 1974, *Mycobates bicornis* (Strenzke, 1954), *Oribatula tibialis* (Nicolet, 1855) and *Oribatula pallida* (Banks, 1906) are given. They are recorded here for the first time from Mongolia. In addition three new species: *Eporibatula prominens* sp. nov., *Haplozetes ulykpani* sp. nov., and *Banksinoma longisetosa* sp. nov. are described.

Key words: Oribatei, new species, Mongolia, *Eporibatula, Haplozetes, Banksinoma*

Descriptions of New Species

Eporibatula prominens sp. nov.

(Figs. 1-4).

Colour. Light yellow-brown.

Measurements. Body length 381 (384) 389 μm; width 186 (196) 202 μm.

Prodorsum. Rostrum distinctly projecting, being not pointed, but rounded. Rostral setae long, barbed, 1.4 × as long as their mutual distance. Lamallae narrow, having a short extension anterior to the insertion of lamellar seta. Lateral part of prodorsum, outside lamella, showing a weak rugose sculpture. Lamellar setae barbed, as long as their mutual distance. Interlamellar setae also barbed and a little longer than lamellar ones. Sensillus club-shaped, with a densely barbed head, which is almost equal in length to its stalk. Exobothridial setae rather long, slightly barbed and a little shorter than interlamellar setae. Bothridium directed anterolaterad, its posterior part concealed under anterior margin of notogaster.

Notogaster. Shape of notogaster oval, being a little narrower anteriorly than posteriorly. Dorsosejugal suture rounded. Humeral projection inconspicuous, hardly projecting beyond the out-

1) Faculty of Biology, National University of Mongolia, Ulaanbaatar 210646, Mongolia.
モンゴル国立大学 生物学部
2) Institute of Environmental Science and Technology, Yokohama National University, Yokohama, 240 Japan.
横浜国立大学 環境科学研究センター 〒240 横浜市保土ヶ谷区常盤台79-7
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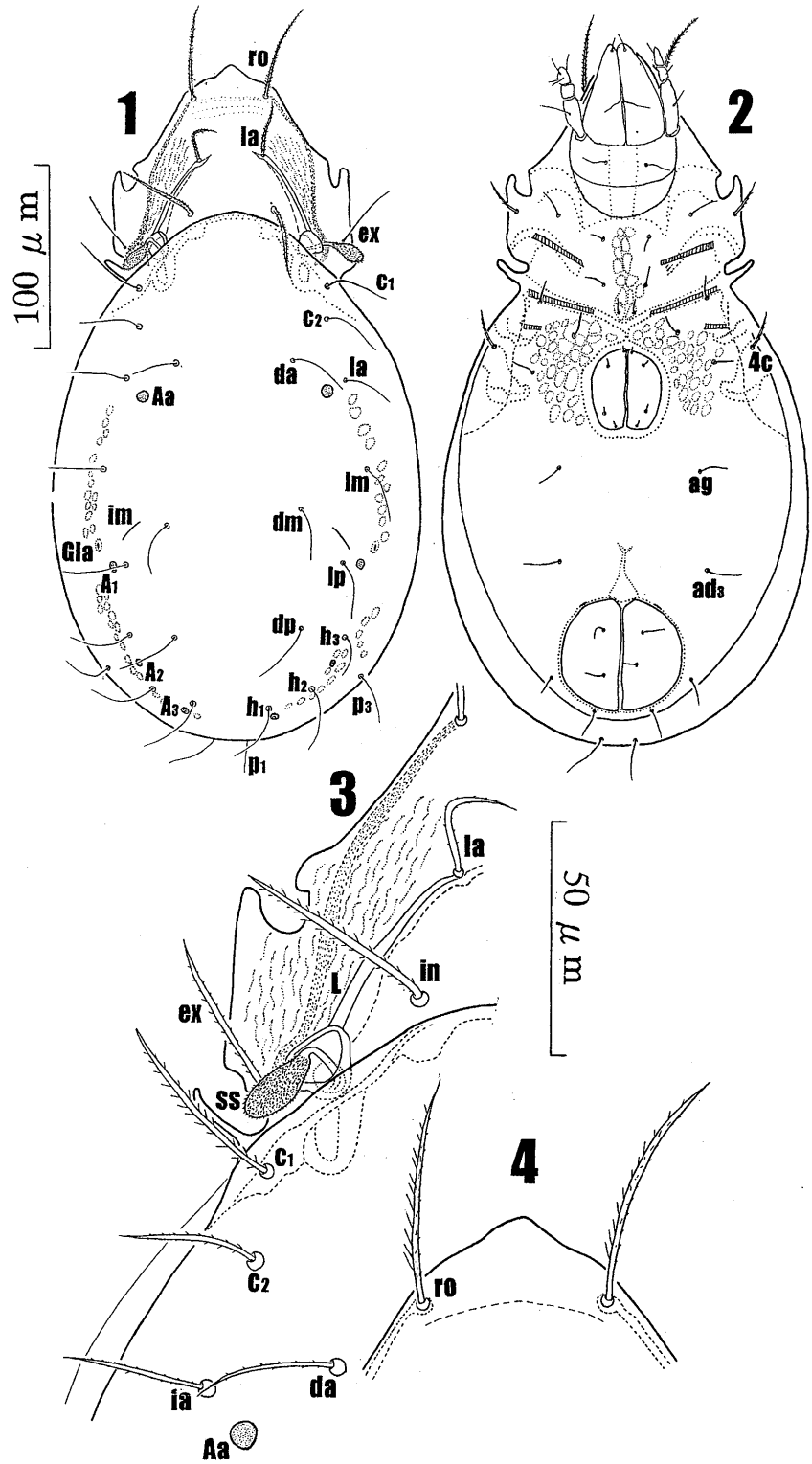


Figs. 1-4. *Eporibatula prominens* sp. nov.
1: Dorsal side. 2: Ventral side. 3: Lateral part of prodorsum and notogaster. 4: Rostral region.

line of notogaster. Thirteen pairs of rather long notogastral setae present; all setae extremely finely barbed. Seta c_1, however, somewhat differing from the remaining notogastral setae, being a little thicker and with more distinct barbation. Seta c_2 inserted a little closer to the median line than c_1; seta *lp* located close to area porosa A_1. Mutual distance between setae *dm-dm* a little larger than those of *da-da* as well as *dp-dp*; setae ps_2 absent. Four pairs of marked areae porosae present; *Aa* usually distincly larger than A_1, and the latter larger than A_2 as well as A_3. Lateroabdominal gland opening *gla* found anterolaterad to A_1. Lyrifissure *im* long, aligned obliquely and situated closely anterior to seta *lp*; lyrifissure *ip* short, located in front of p_3; lyrifissure *ips* as long as *im*, close and lateral to p_1.

Epimeral region. Three pairs of apodemata; *apo.2* and *apo.sj* well developed, aligned obliquelly, almost parallel to each other; *apo.3* short, aligned transversely. Epimeral setal formula 3-1-2-3; setae *1c* and *4c* thicker and more distinctly barbed than the remaining setae.

Ano-genital region. Genital aperture nearly pentagonal, a little longer than width and a slightly narrower posteriorly. Anal aperture a round hexagon, its length and width equal. Ratio in length of anal aperture to genital one: 1.4. Interspace between two apertures twice longer than the length of genital aperture. Ano-genital setal formula 4-1-2-3. Genital setae arranged rather marginally; the distance between g_2-g_3 larger than g_1-g_2, as well as g_3-g_4. Mutual distance of ad_1-ad_1 almost equal to distance of ad_1-ad_2; ad_3 far in front, anterior to level of anterior border of anal aperture; mutual distance ad_3-ad_3 nearly equal to that of aggenital setae. Adanal lyrifissures *iad* aligned obliquelly and situated close to anal margin.

Legs. All tarsi bearing three claws approximately of same size, but the middle one a little thicker than the laterals.

Type series. Holotype and twenty eight paratypes: District Sumber, Gobisumber Province, desert steppe. 21-IX-1991., B. Bayartogtokh (No 1-5-2). The holotype and fourteen paratypes are preserved in the Acaralogy Collection of the Department of Zoology, National University of Mongolia, and fourteen paratypes are deposited in the National Science Museum, Tokyo, Japan.

Remarks. The present new species easily distinguishable from the most of species of the genus *Eporibatula* by the projecting shape of rostrum, the presence of thirteen pairs of notogastral setae and the densely barbed club-shaped sensilli. Among the known species *E. austrialis* Hammer, 1962, *E. gracilis* Hammer, 1958, *E. bicuspidata* Hammer, 1958 and *E. tuberosa* Fujikawa, 1972, resemble the new species in some respect, particularly in shape of lamellae and notogaster. The new species *E. prominens*, however, differs from most of the species mentioned above in having thirteen pairs of minutely barbed notogastral setae (*E. australis* with 11 pairs; *E. gracilis* and *E. bicuspidata* with 10 pairs of notogastral setae). Only *E. tuberosa* has also 13 pairs of smooth notogastral setae, but the new species distinguishable from the latter by the smoothly rounded posterior margin of notogaster (without tuberosities), small body size and more anterior situation of adanal setae ad_3.

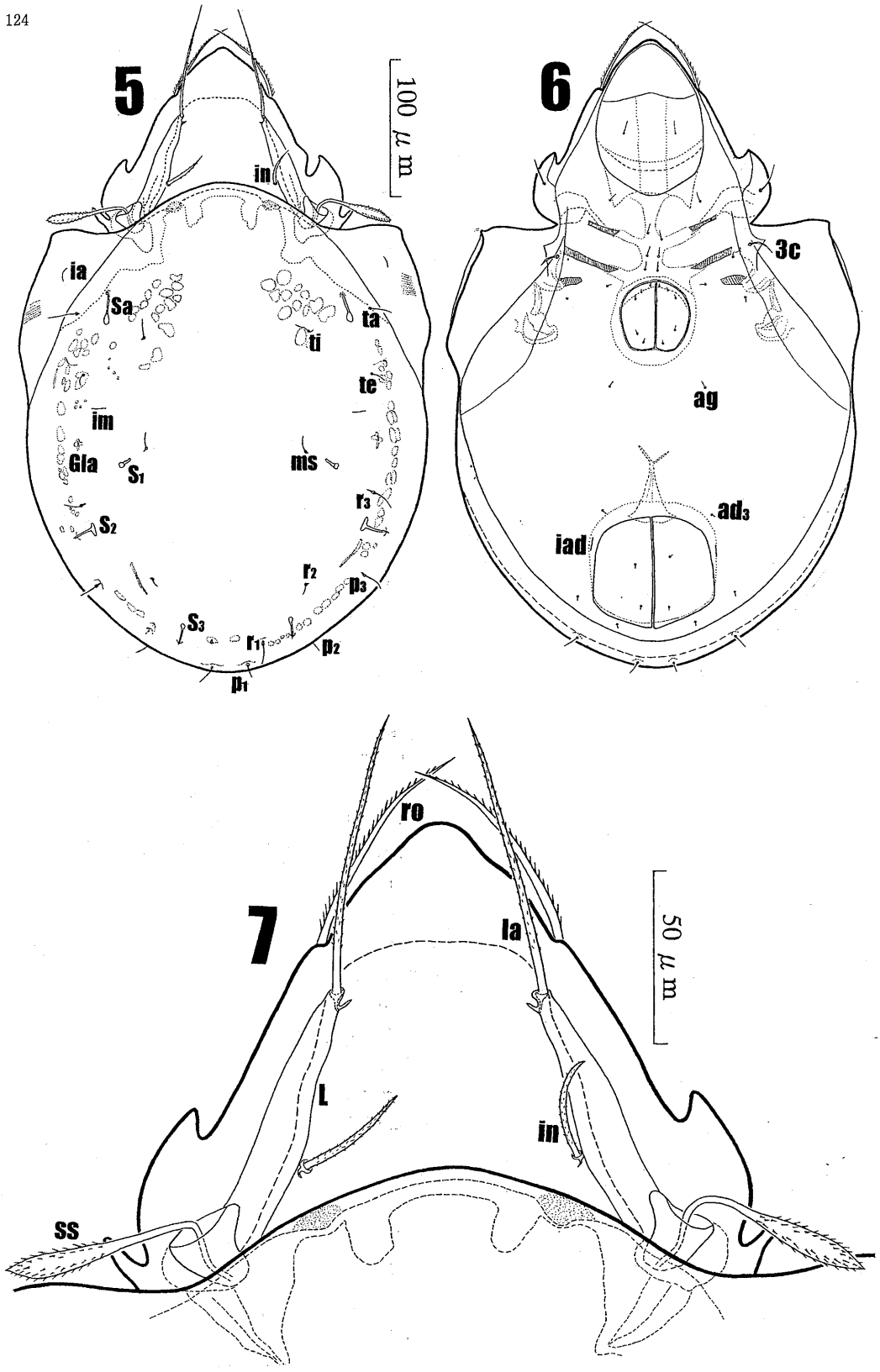
Haplozetes ulykpani **sp. nov.**

(Figs. 5-7)

Colour. Yellow.

Measurements. Body length 434 (446) 456 μm; width of hysterosoma 296 (299) 304 μm.

Prodorsum. Rostrum weakly projecting, but the tip rounded. Rostral setae unilaterally barbed, curved inward, as long as their mutual distance. Transverse prolamellar line present. Lamellae narrow, slightly converging toward anterior direction. Lamellar setae minutely barbed,



Figs. 5-7. *Haplozetes ulykpani* sp. nov.
5: Dorsal side. 6: Ventral side. 7: Prodorsum.

somewhat longer than rostral setae, extending beyond the tip of rostrum for 1/3 its length. Interlamellar setae minutely barbed, very short, about 2.3 times shorter than their mutual distance and 2.5 times shorter than lamellar setae. Posterior parts of bothridia covered by notogaster. Sensillus narrow, with a weakly barbed elongate oval head.

Notogaster. Shape of notogaster oval; dorsosejugal suture arched. Pteromorphae movable, well protruding beyond the outline of notogaster. Fenestrae arranged along the lateral and posterior margins of notogaster. Ten pairs of notogastral setae short and fine; four pairs of sacculi present. Lyrifissures *ia* aligned obliquely, located on pteromorphae and anterolaterally to seta *ta*; *im* almost perpendicular, located posteromedially to seta *te*. Lateroabdominal gland opening *gla* situated anterolaterally to sacculi S_1.

Ventral side. Apodemata *apo.2* and *apo.sj* well developed, aligned obliquelly, parallel to each other, while *apo.3* short and aligned transversely. Integument between apodemata smooth, with nine pairs epimeral setae; setal formula 3:1:3:2. Distance between genital and anal apertures 1.4 × as long as length of the latter. Genital aperture suboval, slightly pointed in front and incurvate at posterior border. Five pairs of genital setae arranged rather marginally; the distance between g_2-g_3 the longest. One pair of aggenital setae present. Anal aperture a rounded hexagon, its length and width nearly equal. Two pairs of anal setae rather distant from margin of anal aperture. Three pairs of adanal setae present; mutual distance ad_1-ad_1 somewhat larger than distance of ad_1-ad_2; distance of ad_1-ad_2 almost equal to that of an_1-an_2; ad_3 far in front, anterior to level of anterior border of anal aperture. Mutual distance ad_3-ad_3 nearly equal to width of anal aperture; mutual distance of aggenital setae somewhat smaller than that of ad_3-ad_3. All epimeral and ano-genital setae minute and slender. Adanal lyrifissures *iad* located close and parallel to lateral margin of anal aperture.

Legs. All tarsi tridactylous, median claw somewhat thicker than laterals.

Type series. Holotype and three paratypes: Mountain "Bulgan", District Erdenebulgan, Arkhangai Province, birch forest. 15-XII-1996., K. Ulykpan (No 1-8-4; 1-14-3); four paratypes: District Bayan, Central Province, dry steppe. 29-IX-1996., (No 9-1-4; 9-4-4); and four paratypes: Mountain "Bogdkhan uul", District Sergelen, Central Province, litter of larch forest, 15-XI-1991, B. Bayartogtokh (No 4-7-10). The holotype and seven paratypes are preserved in the Acaralogy Collection of the Department of Zoology, National University of Mongolia, and four paratypes are deposited in the National Science Museum, Tokyo, Japan.

Remarks. Haplozetes ulykpani sp. nov. is somewhat similar to *H. windobonensis* (Willmann, 1935) from Europe. The new species is, however, readily distinguishable from the above species by (1) the very short interlamellar setae, (2) the relatively long rostral setae, (3) the medially removed situation of lamellae (in *H. windobonensis* lamellae situated laterally, along lateral margin of prodorsum), and (4) the bothridia not complitely concealed (only posterior part) under the anterior margin of notogaster. The new species was named after Dr. K. Ulykpan, Department of Ecology, National University of Mongolia, who was kind enough to offer the authors the interesting oribatid mites including the present new species.

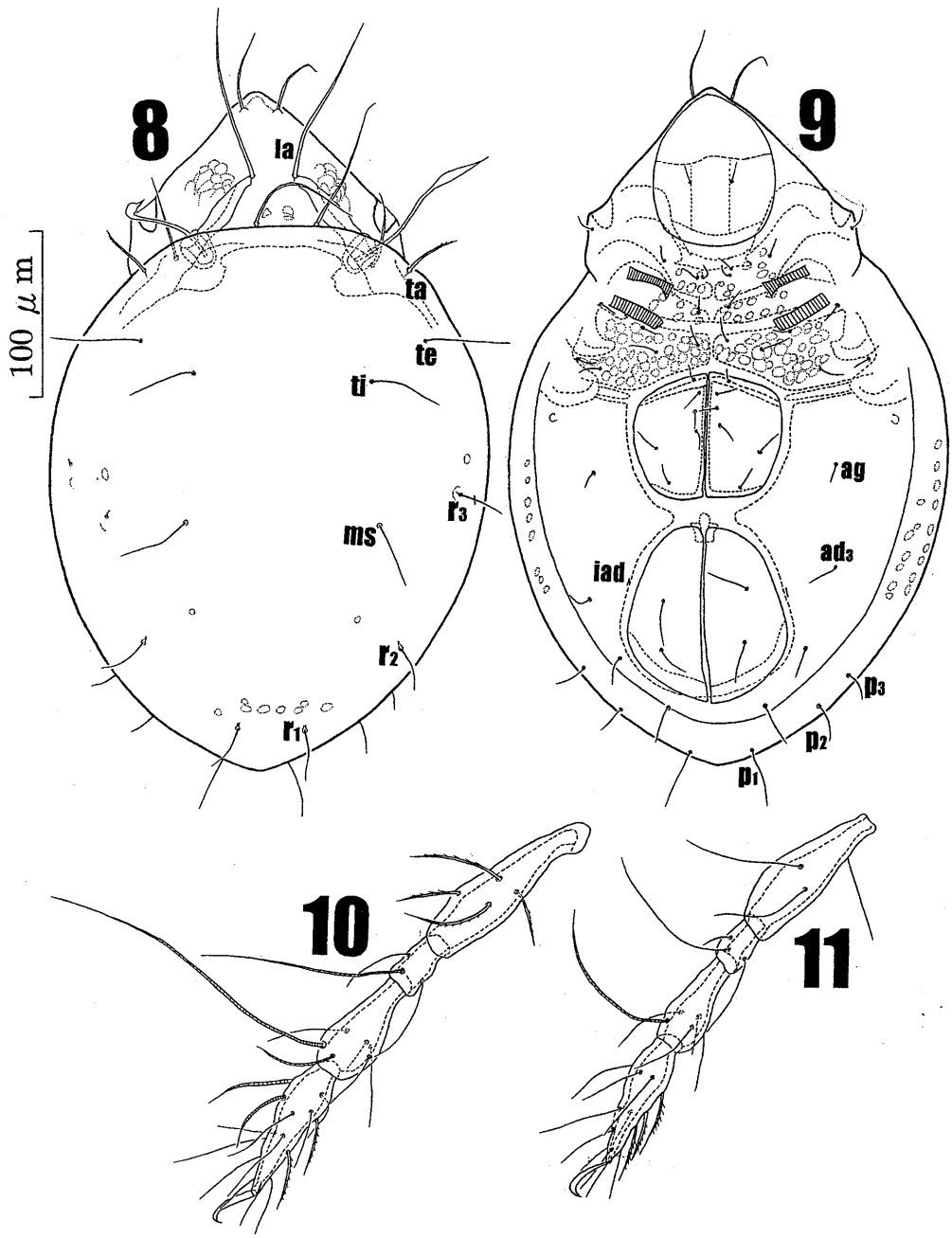
***Banksinoma longisetosa* sp. nov.**

(Figs. 8-12)

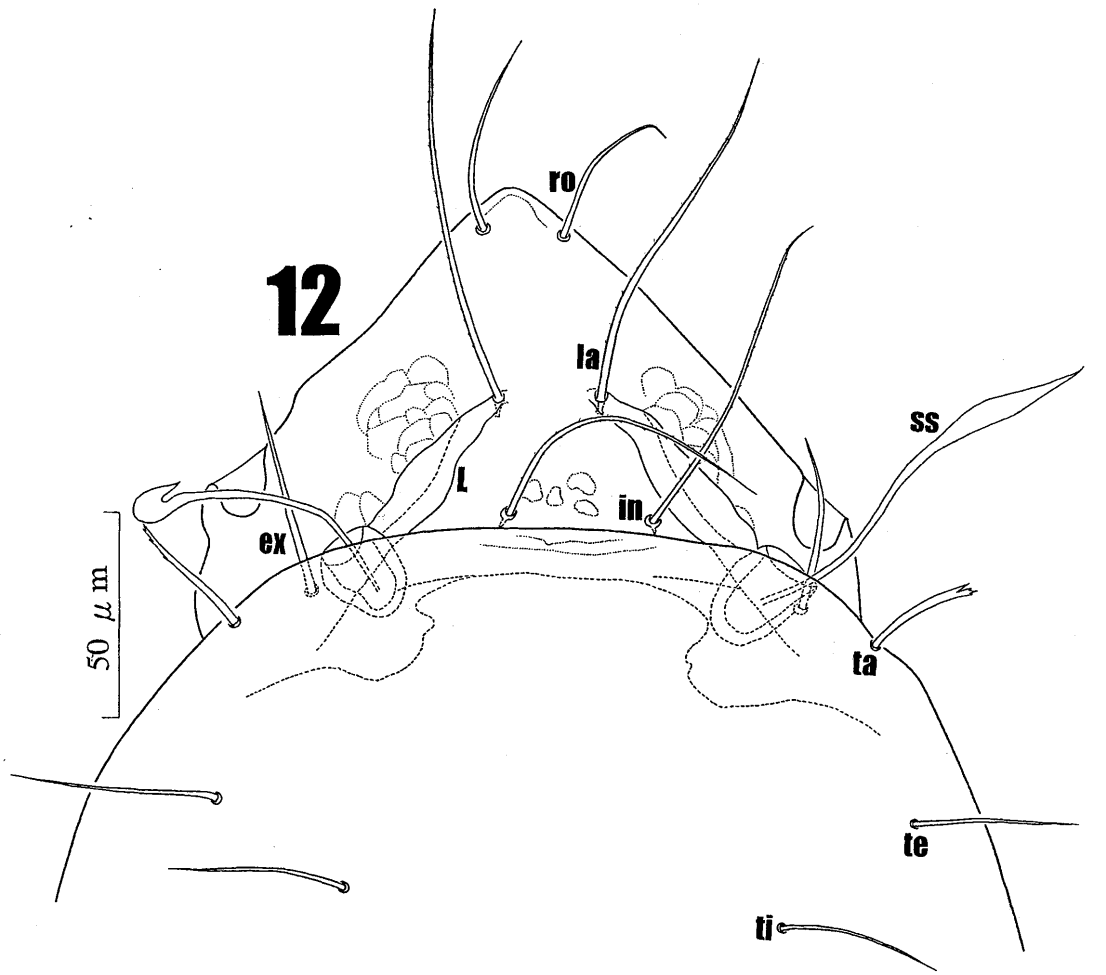
Colour. Yellow-brown.

Measurements. Body length 406 (416) 425 μm; width 240 (255) 264 μm.

Prodorsum. Shape of prodorsum triangular. Rostrum rounded. Rostral setae fairly long,



Figs. 8-12. *Banksinoma longisetosa* sp. nov.
8: Dorsal side. 9: Ventral side. 10: Leg I (left). 11: Leg II (left). 12: Prodorsum.



glabrous and situated close together, about twice longer than their mutual distance and extending for 3/4 its length beyond the tip of rostrum. Costulae short (shorter than half the length of prodorsum), narrowed anteriorly, converging toward anterior direction. Anterolateral part of costulae covered with a number of irregular areoles. Lamellar setae weakly barbed unilaterally, long, about 2.2 × as long as rostral setae, nearly 4 times longer than their mutual distance, and extending for 1/2 its length beyond the tip of rostrum. Interlamellar setae weakly barbed bilaterally, also long, but a little shorter than lamellar ones and reaching to the tip of rostrum. Bothridium mostly or completely covered by the anterior margin of notogaster. Sensillus with a rather long, thin peduncle and a slender spindle-shaped head sharply pointed apically. Exobothridial setae rather long and thick, as long as notogastral setae *te*.

Notogaster. Shape of notogaster oval, slightly tapering posteriorly and posterior margin of notogaster protruding rather in a triangular shape. Dorsosejugal suture almost straight, but weakly arched laterally. Surface of notogaster smooth, only a few fenestrae irregularly scattered on the posterior part of notogaster. Ten pairs of notogastral setae fairly long; seta *ta* relatively thick and short (about 1.5 times shorter than seta *te*), and roughened apically; other notogastral setae smooth and fine. Lyrifissures *im* located posterolaterally close to seta r_3.

Epimeral region. Surface of epimeral region covered with an irregularly spaced round reticulation. Coxisternal ridges *I, II, SJ* and *IV* all complete. Coxisternal ridge *IV* consisting of double chitinous lines. Apodemata *apo.2* and *apo.sj* well developed, aligned obliquelly, parallel to each other; *apo.3* and coxisternal ridge *III* absent. Epimeral setal formula 3:1:3:3; all epimeral setae fine and glabrous.

Ano-genital region. Anal and genital apertures large, located close to each other and surrounded by sclerozited rings. Six pairs of genital, one pair of aggenital, two pairs of anal and three pairs of adanal setae present. All ano-genital setae rather long and fine. Setae g_3, g_4, g_5 and g_6 situated close to median margin of genital plates, while g_1 and g_2 arranged rather distant from both median and lateral margins, but a little close to lateral margin. Mutual distance of aggenital setae *ag* nearly equal to that of ad_3-ad_3. Adanal lyrifissures *iad* very small, located to the level of anal seta an_2.

Legs. All tarsi monodactyle, tibia I with extremely long solenidion ϕ_1, and short ϕ_2 inserted nearly in front of ϕ_1. Chaetotaxy of legs I and II shown in figs. 10-11.

Type series. Holotype and five paratypes: Mountain "Bulgan", District Erdenebulgan, Arkhangai Province, birch forest. 15-XII-1995., K.Ulykpan (No 3-6-7). The holotype and three paratypes are preserved in the Acaralogy Collection of the Department of Zoology, National University of Mongolia, and two paratypes are deposited in the National Science Museum, Tokyo, Japan.

Remarks. The present new species is well distinguished from all the other congeneric species by the very long lamellar and interlamellar setae, and the relatively wide and anteriorly tapering shape of costulae. In the shape of costulae and rostrum the new species somewhat similar to the *B. setosa* Rjabinin, 1974. However, the new species differs from the above mentioned species by (1) the far long rostral, lamellar and interlamellar setae, (2) the smooth and apically tapering shape of sinsilli, (3) the relatively wide and anteriorly tapering shape of costulae, (4) the posteriorly slightly tapering shape of notogaster, (5) the inconspicous humeral projection, and (6) relatively small body size. In the shape of sensilli and rostrum the new species resembles *B. lanceolata oudemansi* Fujikawa, 1978. However, the new species pretty differs from the latter by (1) the relatively wide and slightly convergent shape and more widely separated arrangement of costulae, (2) the far long lamellar and interlamellar setae, (3) the more posterior situation of exobothridial setae, (4) the relatively short notogastral setae, and (5) the laterally removed situation of genital setae g_1 and g_2.

Redescriptions of Known Species

Oribatella shaldybinae Rjabinin

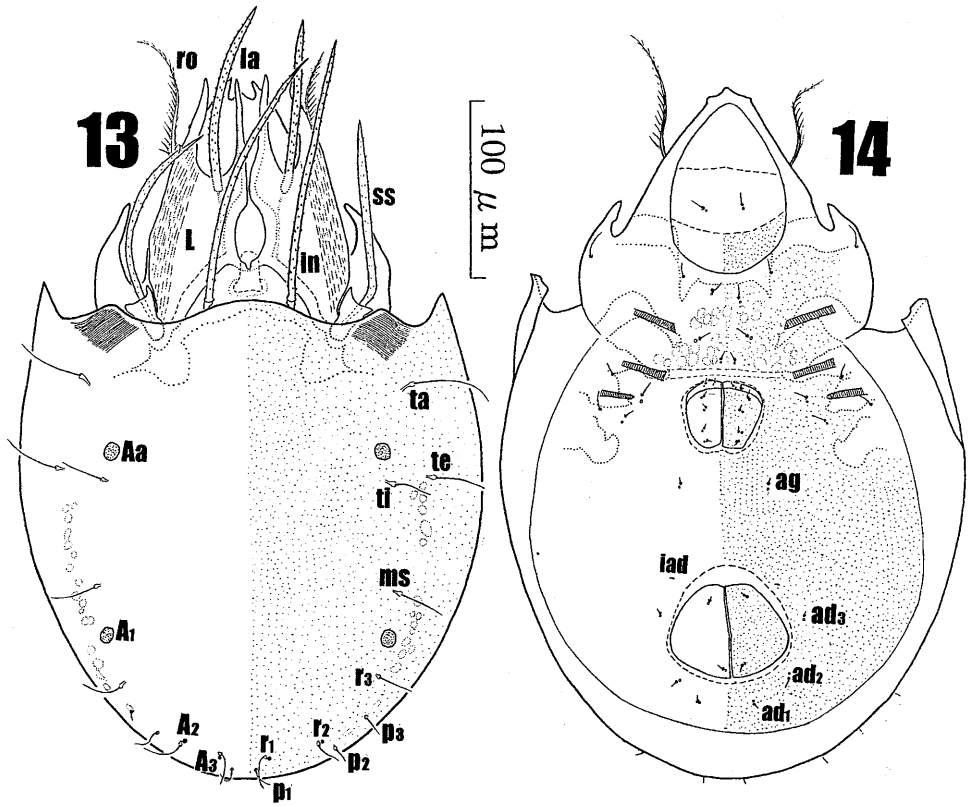
(Figs. 13, 14)

Oribatella shaldybinae Rjabinin, 1974. p. 1173, fig. 3; Krivolutsky, 1975, p. 332, fig. 833.

Colour. Deep reddish-brown.

Measurements. Body length 397 (401) 405 μm; width 263 (272) 287 μm.

Prodorsum. Rostrum with three small tips. Lamellae broad, covering prodorsum except rostral part. Lateral side of lamella almost straight, while the medial side is strongly curved. Distinct stripes of furrows along the outer margin. Two tips of the lamella long, nearly equal in length; the outer tip has two small teeth on outer margin; the inner tip usually toothless; interspace between the tips deeply concaved in U-shape. Rostral seta thin and strongly barbed; lamellar seta



Figs. 13, 14. *Oribatella shaldybinae* Rjabinin, 1974.
13: Dorsal side. 14: Ventral side.

very thick, barbed with coarse spines, projecting with half their length beyond the tip of lamella. Interlamellar seta thinner than lamellar one and also minutely barbed, reaching beyond the tip of lamella. Sensillus setiform, sparsely barbed and extending a little beyond the base of lamellar seta. Bothridium partly covered by the anterior margin of notogaster.

Notogaster. Whole surface of notogaster covered with a very small dark granules. Dorsosejugal suture weakly arched anteriorad; posterior margin of notogaster broadly rounded. Anterior portion of pteromorpha laterally to bothridium wrinkled densely with transverse striae; ventrodistal end of pteromorpha provided with a small tooths. Ten pairs of notogastral setae thin, smooth. Four pairs of areae porosae present; *Aa* and A_1 rather large; while A_2 and A_3 very small, situated laterally close to the setae h_2 and h_1, respectively.

Ventral side. Surface of ventral side and also anal and genital plates covered with a very small dark granules. Apodemata *apo.sj* and *apo.2* well developed, *apo.3* short and slender. Epimeral region with a few round areoles; setal formula 3:1:3:2. Interspace between genital and anal apertures about 1.5 × as long as anal aperture. Six pairs of genital, one pair of aggenital, two pairs of anal and three pairs of adanal setae present. All ventral setae minute and glabrous. Adanal lyrifissures *iad* situated preanally at a relatively long distance from anal plates.

Legs. All legs tridactylous, the median claw distinctly thicker than the laterals.

Material examined. Fourteen specimens: Mountain "Bogdkhan uul", District Sergelen, Central Province, litter of larch forest, 15-XII-1990., B. Bayartogtokh (No 1-24-7).

Remarks. The feature of Mongolian specimens is well in accord with the original description and the figures of *O. shaldybinae* Rjabinin, from the Southern part of the Russian Far East region.

Mycobates bicornis (Strenzke)

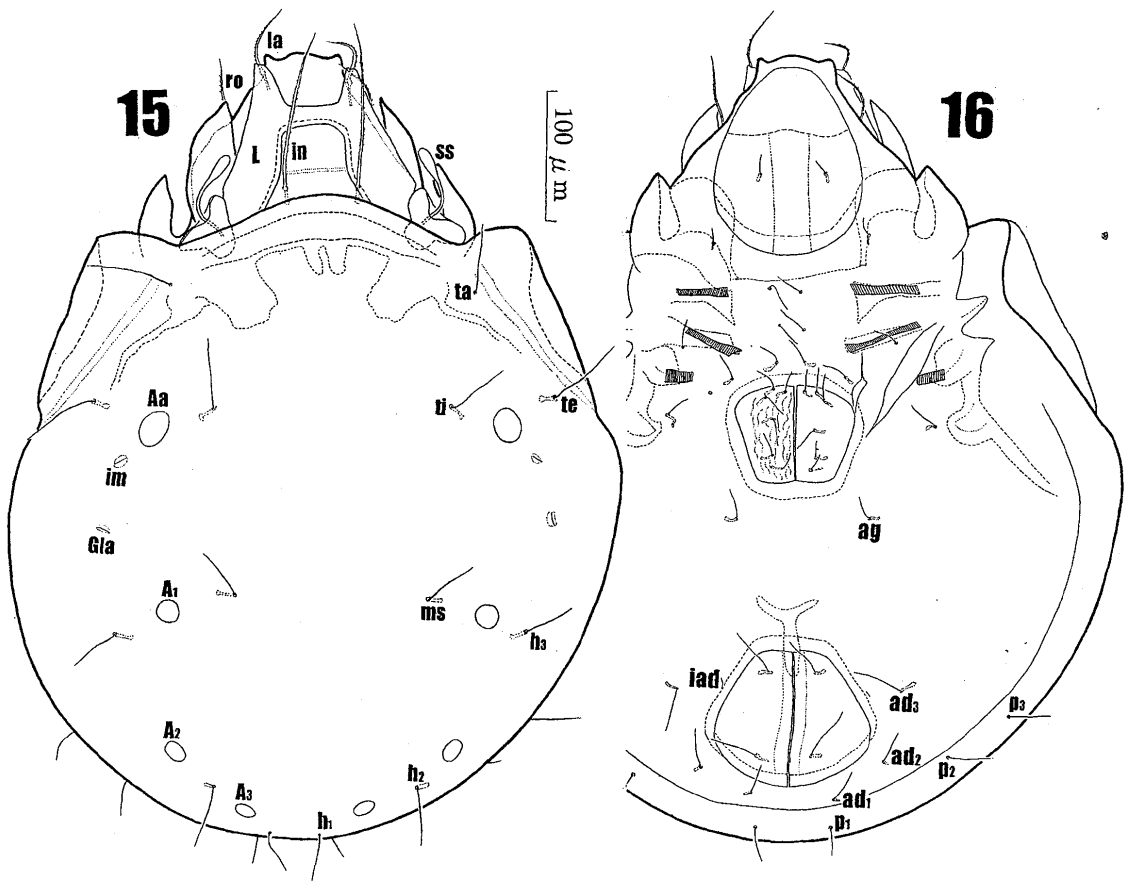
(Figs. 15, 16)

Permycobates bicornis Strenzke, 1954, p. 92, figs. 1-5.
Mycobates bicornis: Shaldybina, 1975, p. 304, fig. 753.

Colour. Dark-brown to almost black.

Measurements. Body length 620 (638) 660 μm; width of hysterosoma 440 (443) 448 μm.

Prodorsum. Rostral margin bearing on each side a distinct conical tooth; the middle part between these projections broadly rounded. Rostral setae relatively short, finely barbed unilaterally, not reaching to the tip of rostrum, but slightly extending beyond the anterior end of lamellar cusps. Lamellae rather broad, distinctly narrowed anteriorly, being connected by a fairly long and broad translamella. Lamellar cusps broad at base, as long as length of



Figs. 15, 16. *Mycobates bicornis* (Strenzke, 1954).
15: Dorsal side. 16: Ventral side.

translamella, each cusp distinctly tapering anteriorly; their median margins together with translamella form a converted U-shaped arch. Behind translamella found an indistinct straight line connecting the inner margins of lamellae. Lamellar setae finely barbed unilaterally, nearly as long as rostral setae, arising anteriorly on cusps and extending beyond the tip of rostrum almost 1/4 of their length. Interlamellar setae thin, weakly barbed bilaterally and slightly extending beyond the tip of rostrum. Tutorium of a broad blade-like structure, its anterior margin without teeth or incisions. Sensillus with a long, thin peduncle and a smooth, slendery club-shaped head directed anteromediad. Bothridium partly covered by the anterior margin of notogaster.

Notogaster. Shape of notogaster almost round, ratio of length and width 1 : 1.04. Surface of notogaster smooth; dorsosejugal suture arched. Pteromorphae well developed, movable and ventrally curved. Ten pairs of rather long and fine notogastral setae present. Four pairs of areae porosae nearly circular to oval, very difficult to see, only their margin visible. Among them *Aa* the largest, about 1.7 × as large as remaining areae porosae. Lyrifissure *im* located posterolaterally to area porosa *Aa*.

Ventral side. Epimeral region smooth, apodemata *apo.sj* and *apo.2* well developed, *apo.3* short. Epimeral setal formula 3:1:3:2; all setae rather long and glabrous. Genital and anal apertures surrounded each by a sclerozited ring; distinct longitudinal striae found on genital plates. Six pairs of genital, one pair of aggenital, two pairs of anal and three pairs of adanal setae present. Adanal lyrifissures *iad* short, located nearly on the level of seta ad_3.

Legs. All tarsi tridactylous, the median claw much thicker than the laterals.

Material examined. Three specimens: Mountain "Bulgan", District Erdenebulgan, Arkhangai Province, birch forest. 15-XII-1996., K. Ulykpan (No 2-5-1).

Remarks. The features of Mongolian specimens well agree in detail with the European ones described by Strenzke (1954). Slight difference between them is only somewhat small body size of the Mongolian form.

Oribatula tibialis **(Nicolet)**

(Figs. 17, 18)

Notaspis tibialis Nicolet, 1855, p. 449, fig. 8.

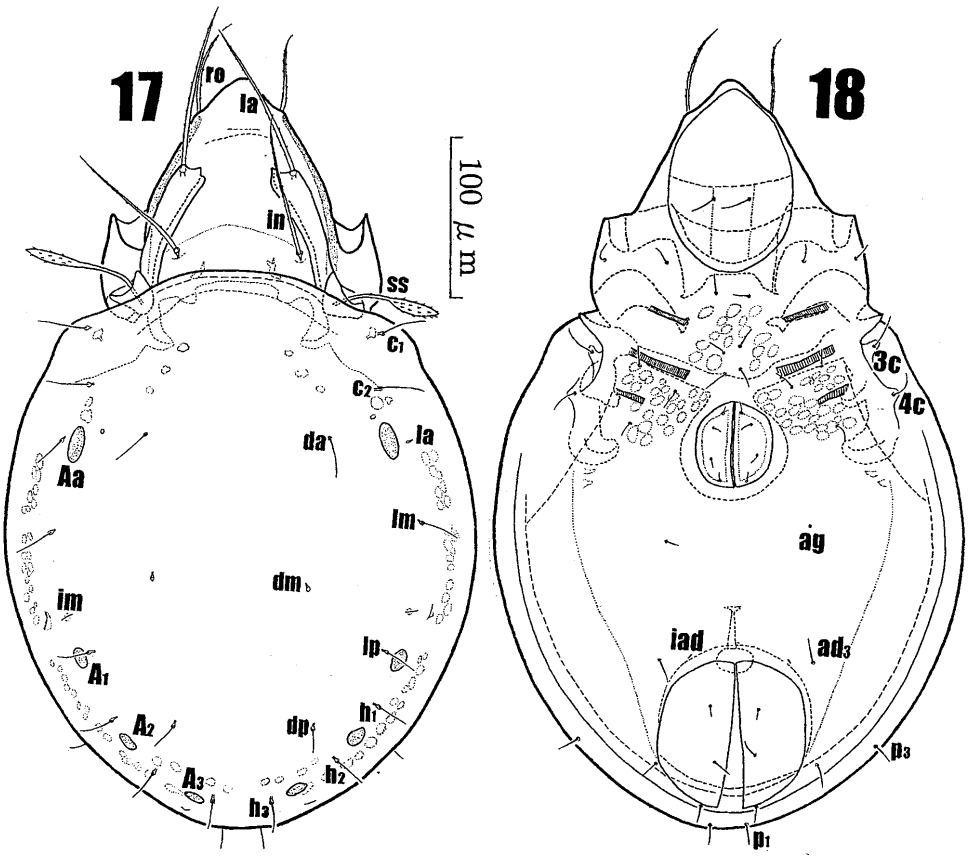
Oribatula tibialis: Sellnick, 1928, p. 17; Willmann, 1931, p. 155, fig. 225; Hammer, 1952, p. 43, fig. 65; Pērez-Iñigo, 1974, p. 368, figs. 1-3; Wunderle, Beck & Woas, 1990, p. 16, figs. 1-4.

Colour. Yellow.

Measurements. Body length 462 (490) 512 μm; width 296 (314) 332 μm.

Prodorsum. Rostrum rounded. Rostral setae weakly barbed bilaterally, nearly as long as their mutual distance. Lamellar setae long, extending for 1/3 its length beyond the tip of rostrum; each seta inserted just on the lateral end of lamella. Interlamellar seta a little shorter than lamellar ones. All prodorsal setae thin and weakly barbed bilaterally. Lamellae broad, slightly widened anteriorly, converging toward anterior direction, being shorter than their mutual distance at base. Translamella absent. Sensillus directed laterally, bearing a weakly swollen head with barbs.

Notogaster. Shape of notogaster rounded oval; dorsosejugal suture arched. Humeral projection small, but distincly developed and slightly projecting beyond the outline of notogaster. Thirteen pairs of notogastral setae fine and glabrous; four pairs of areae porosae oval in shape. Area porosa *Aa* usually distinctly larger than the others. Lyrifissure *im* short, situated among setae



Figs. 17, 18. *Oribatula tibialis* (Nicolet, 1855).
17: Dorsal side. 18: Ventral side.

lm and *lp*. Lateroabdominal gland opening *gla* located lateral to *im*. Fenestrae arranged along the lateral and posterior margins of notogaster.

Epimeral region. Epimeral region with a few round areoles. Apodemata *apo.2* and *apo.sj* distinctly developed, *apo.3* short. Epimeral setal formula 3:1:3:3.

Ano-genital region. Genital aperture being completely surrounded by a broad chitinized ring, touching apodema *apo.sj*. Distance between anal and genital apertures twice as long as length of the latter. Four pairs of genital, one pair of aggenital, two pairs of anal and three pairs of adanal setae present; all setae thin and glabrous. Mutual distance of aggenital setae nearly equal to that of ad_3-ad_3. Adanal lyrifissures *iad* situated preanally to the level of seta ad_3.

Legs. All tarsi tridactylous, lateral claws much thinner than medial one.

Material examined. Twenty eight specimens: Mountain "Bulgan", District Erdenebulgan, Arkhangai Province, birch forest. 15-XII-1996., K. Ulykpan (No 1-19-12).

Remarks. The character of Mongolian specimens well agree with the original description by Nicolet (1855), and also the redescription of European specimens by other authors (Wunderle, Beck & Woas, 1990).

Zygoribatula pallida (Banks)

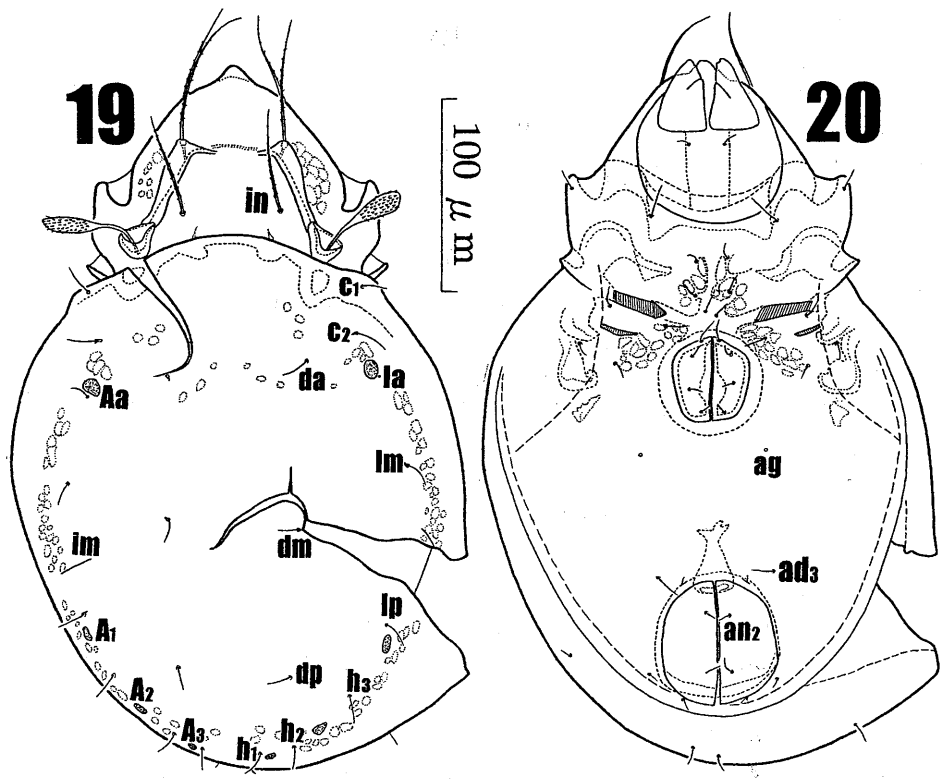
(Figs. 19, 20)

Zygoribatula pallida Banks, 1906, p. 494; Hammer, 1952, p. 44, fig. 67.
Oribatula pallida: Bulanova-Zakhvatkina, 1975, p. 256, fig. 594.
Zygoribatula bulanovae Kulijew, 1961, p. 77, fig. 2.

Colour. Yellow.

Measurements. Body length 344 (352) 360 μm; width 232 (240) 244 μm.

Prodorsum. Rostrum with pointed apex, but the tip rounded. Rostral setae weakly barbed unilaterally, fairly long, as long as their mutual distance. Lamellae rather broad, distinctly widened anteriorly; translamella interrupted medially. Transverse prolamellar line present. Lamellar setae long, weakly barbed bilaterally, extending 1/2 its length beyond the tip of rostrum. Lateral part of lamellae covered with a few irregular granules. Interlamellar setae fine, weakly barbed bilaterally, and a little shorter than lamellars. Bothridium mostly or completely uncovered by the anterior margin of notogaster. Sensillus having an oval head roughened, which is almost equal in length to its stalk.



Figs. 19, 20. *Zygoribatula pallida* (Banks, 1906).
19: Dorsal side. 20: Ventral side.

Notogaster. Shape of notogaster oval, dorsosejugal suture arched. Humeral projection not so conspicous, hardly projecting beyond the outline of notogaster. Fenestrae arranged along the lateral and posterior margins of notogaster. Thirteen pairs of notogastral setae short, fine and glabrous. Four pairs of areae porosae oval in shape; *Aa* usually distinctly larger than A_1 and A_2, and the latters larger than A_3. Lyrifissure *im* aligned obliquely, situated anterior to seta *lp*. Lateroabdominal gland opening *gla* inconspicuous.

Epimeral region. Surface of epimeral region covered with irregularly spaced round areoles. Apodemata *apo.sj* well developed; *apo.3* short and slender. Epimeral setal formula 3:1:2:3; all setae fine and short.

Ano-genital region. Anal and genital apertures surrounded each by a sclerozited ring; distance between them 1.4 × as long as length of anal aperture. Four pairs of genital, one pair of aggenital, two pairs of anal and three pairs of adanal setae present. Mutual distance of aggenital setae nearly equal to that of adanal setae ad_3-ad_3. Adanal lyrifissures *iad* situated preanally, a little posterior to the level of seta ad_3.

Legs. All legs tridactylous, the median claw slightly thicker than the lateral ones.

Material examined. Five specimens: Mountain "Bogdkhan uul", District Sergelen, Central Province, litter of larch forest, 15-XII-1990, B. Bayartogtokh (No 1-6-5).

Remarks. The character of Mongolian specimens well agree with the original drawing of *Z. pallida* by Banks (1906), and also redescriptions of other authors (Hammer, 1952, Bulanova-Zakhvatkina, 1975).

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