A NEW GENUS OF ORIBATID MITES, EXHIBITING BOTH THE CHARACTERISTIC FEATURES OF THE FAMILIES CHARASSOBATIDAE AND CYMBAEREMAEIDAE (ACARI : CRYPTOSTIGMATA)

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INTRODUCTION

We always meet with a great difficulty in taxonomical treatment, when we find a new taxon having two characters, one of which is considered to be very important feature of a known taxon A and the other is also such a feature of the other known taxon B. As an example of such a case, the authors found a new species of oribatids belonging to a new genus described below. Having well-developed lamellae with long cups meeting medially, the genus should be placed in the family Charassobatidae, whereas it is no doubt a member of the family Cymbaeremaeidae, if we take notice of the hysterosoma in ventral aspect. Even after a close examination of the remaining features of the genus, no reasonable decision on its taxonomical treatment could be made at the present moment. The aims of the present paper is to call attention to the presence of such a " mosaic taxon " (see p. 7) and to grope after solution of problem in its taxonomical treatment.

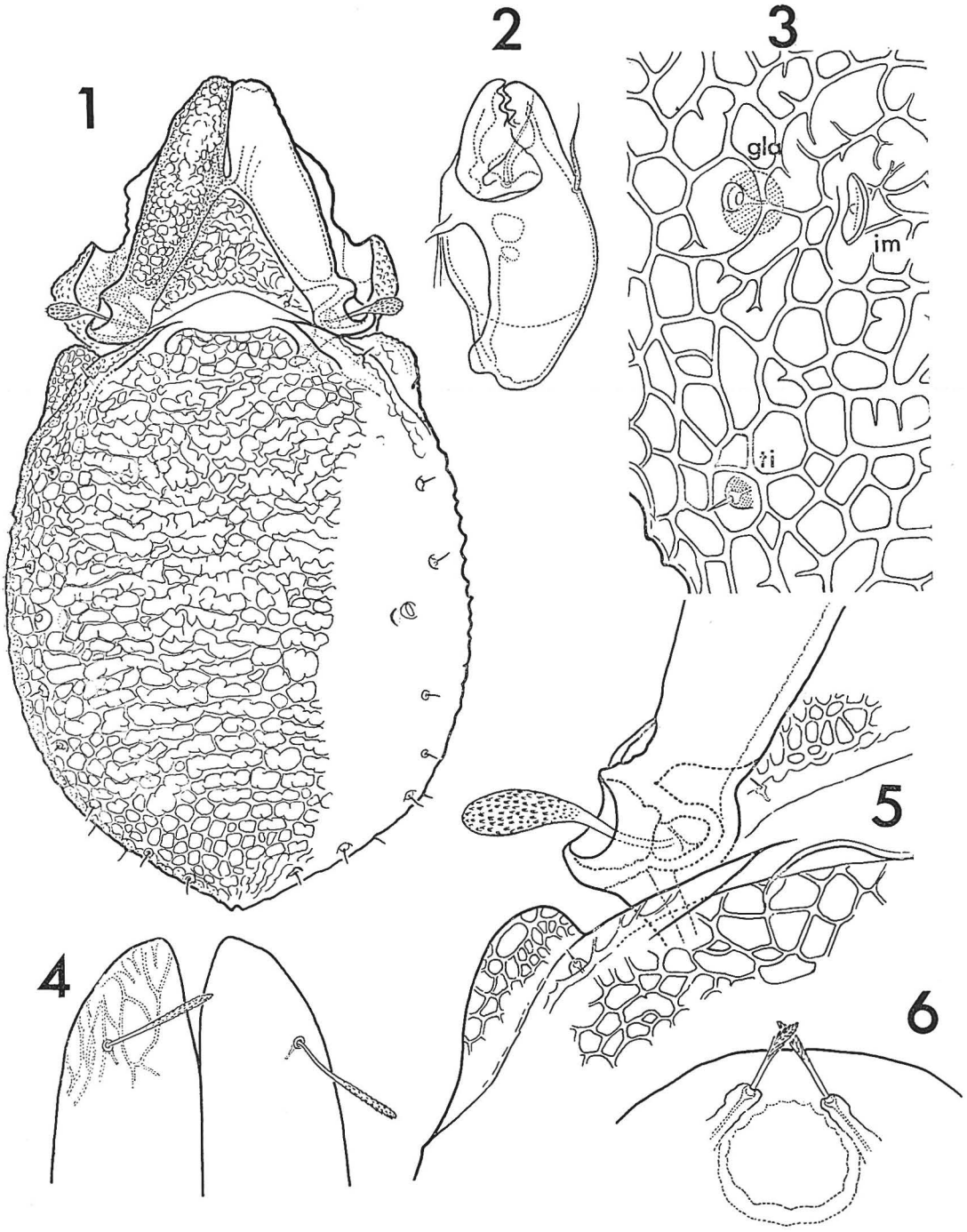
DESCRIPTION

Coropoculia gen. nov.

Lamellae converging anteriorly, their cusps being parallel, touching each other and covering rostrum completely. Interlamellar setae minute. Sensillus strongly clavate. Notogaster with lobe-shaped humeral projections. Genital and anal apertures close together, the latter elongate oval in shape. Ventral plate pointed at the posterior end, being largely covered laterally by notogaster strongly bending ventrally. Number of setae in ano-genital region — g : 6-6, ag : 1-1, an : 2-2, ad : 3-3. Tarsi heterotridactylous. Chelicerae normal.

The generic name, *Coropoculia*, was derived from " Koropokkuru ", an Aino's legendary sprite which is said to dwell under the leaves of coltsfoots on the ground.

Type-species : *Coropoculia reticulata* spec. nov.



FIGS. 1-6 : *Coropoculia reticulata* gen. nov. et spec. nov. ; 1 : Dorsal aspect ; 2 : Chelicera ; 3 : Surface sculpture on notogaster ; 4 : Lamellar cusps and lamellar setae (ventral aspect) ; 5 : Dorsosejugal region (left side) ; 6 : Rostrum with rostral setae.

Coropoculia reticulata spec. nov.
(Figs. 1-11)

Material examined : Holotype (NSMT-Ac 3336) : Glehn's spruce forest, Mt. Meakan-dake, Mo-ashoro in Hokkaido, North Japan. 9-XI-1968. T. FUJIKAWA leg. ; 50 paratopotypes and 3332 topotypes : the same data as the holotype. The holotype and the paratopotypes are deposited in National Science Museum, Tokyo.

Measurement : Length : 585 (608) 635 μ ; width : 320 (350) 406 μ.

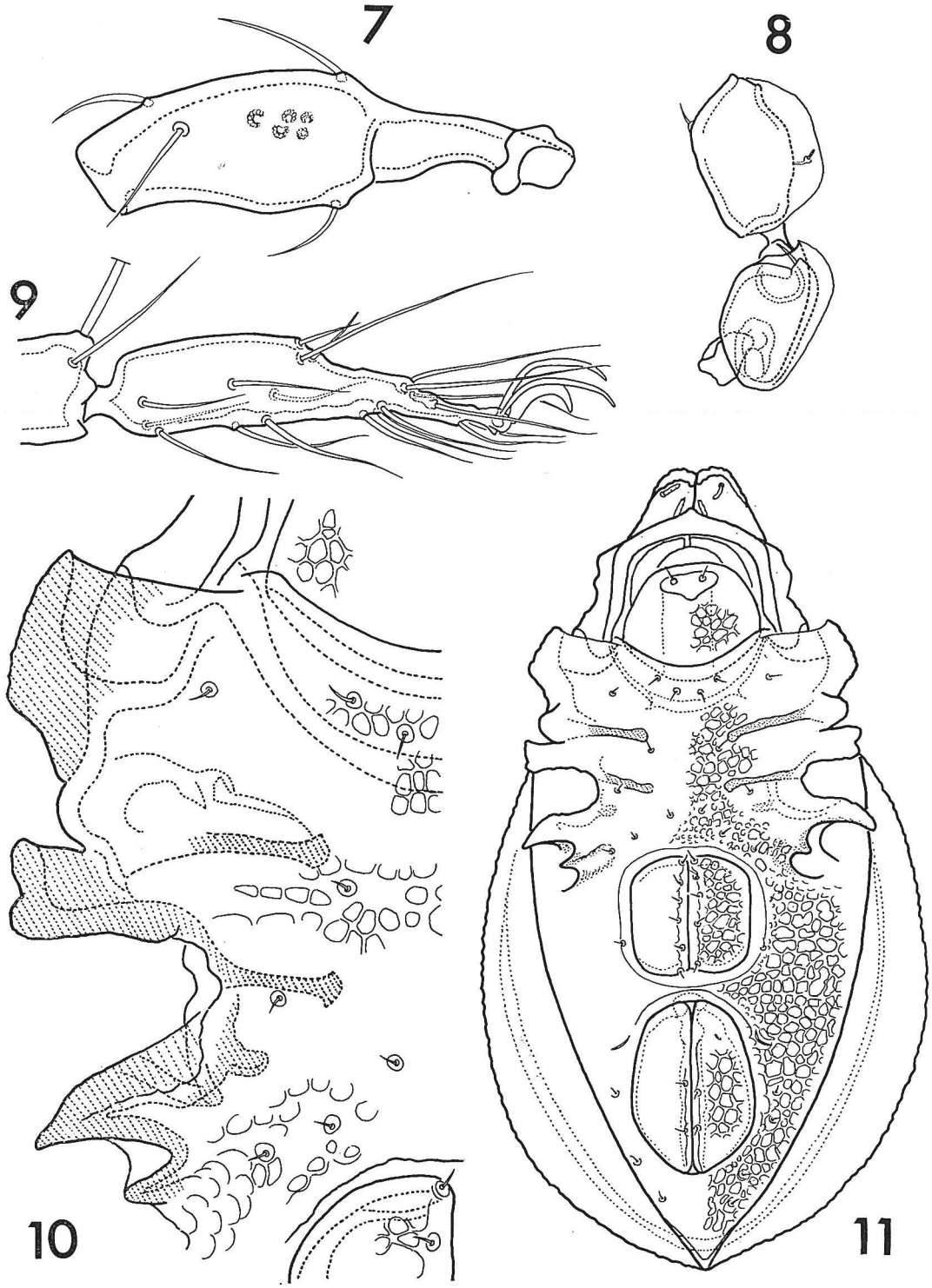
Prodorsum : Lamellae converging anteriorly, with cusps almost touching along their mesal margins and well projecting beyond the rostral margin ; the cusp (in dorsal view) about 3/4 as long as the portion of lamella excepting the cusps ; observed in crushed specimens, both the portions are, however, equal in length. Lamellar surface strongly swollen and convex, being covered with irregular network. Lamellar setae not visible in dorsal aspect, because they are inserted on the ventral sides of lamellae ; the setae inserted at level as distant from the tip of lamella as their length, being barbed and slightly thickened distally (Fig. 4). Rostral seta also hardly visible in normal position of mite, being thicker and shorter than lamellar seta and inserted dorsally near the anterior margin of rostrum (Fig. ( ). The medioproximal part of prodorsum, uncovered by lamellae, is triangular ; near the basal line is found a weak, arched ridge, on which minute interlamellar setae are inserted. The surface of prodorsum irregularly reticulated anterior to the ridge and glabrous posterior to the ridge. Sensillus bearing an elongate oval head roughened.

Notogaster : Notogaster shield-shaped, being weakly pointed at the posterior end which has often a small notch. A large, shallow concavity found on the posterior part of notogaster. Humeral projection lobe-shaped, the margin being smoothly rounded. Dorsosejugal suture interrupted medially. A pair of weak, arch-shaped structures found on the anterior margin of notogaster. Ten pairs of minute notogastral setae exist ; each of them inserted on a rounded apophyse which is situated in a cup-shaped hollow. The whole surface is covered with network-like sculpture, but its cells often broken to make fusions here and there. Notogastral fissures *im* located usually on the same level as *gla*, though sometimes they are situated a little posterior or anterior to *gla*.

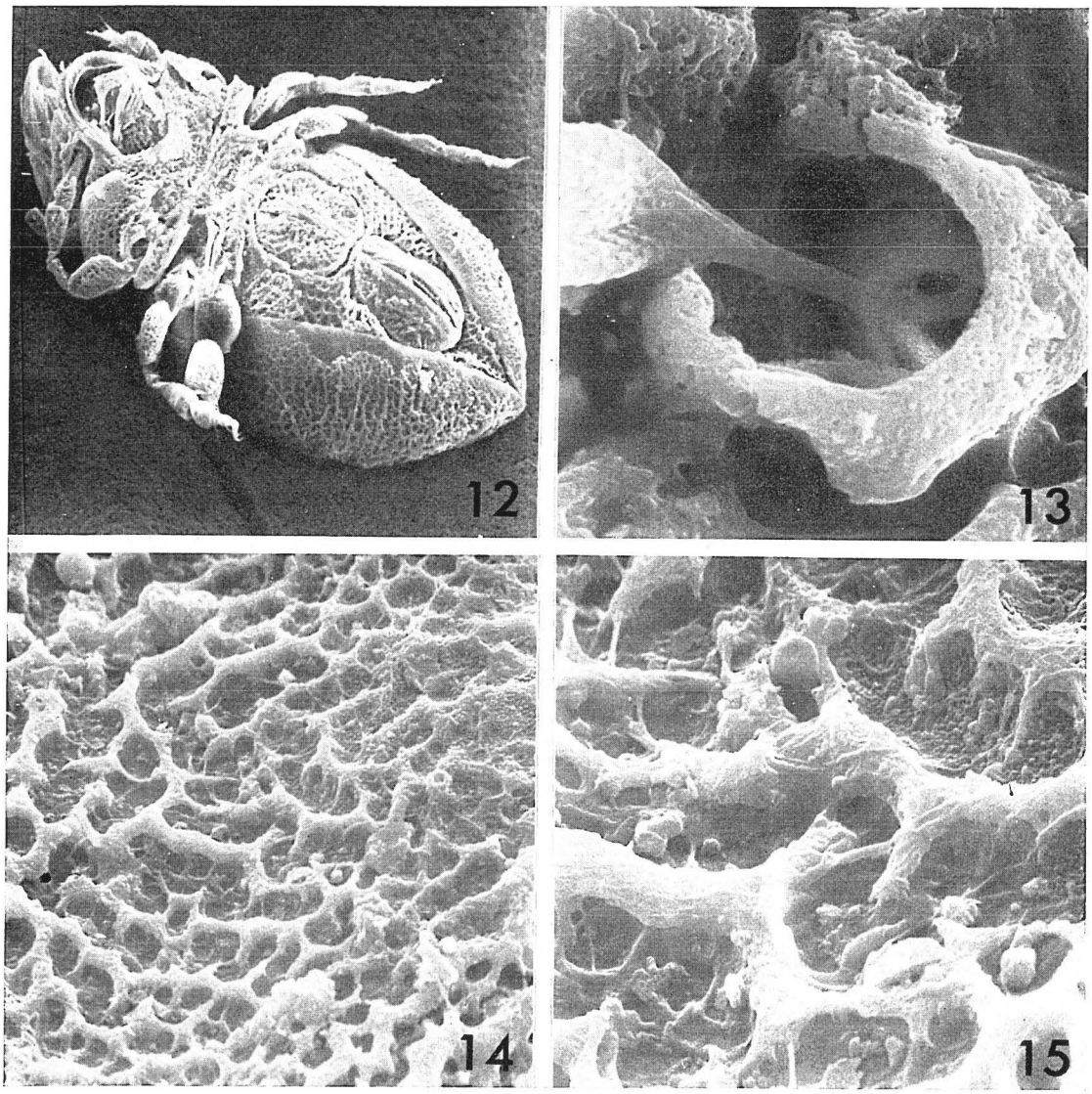
Ano-genital region : Genital aperture nearly quadrate. Anal aperture elongate oval or shaped as an distorted hexagon ; anal opening longer and slightly broader than genital one ; interspace between them 1/3.4-1/7 of the length of genital opening. Genital plates typically with 6 pairs of setae. A pair of aggenital setae located close to the lateral margins of genital aperture. Three adanal setae on each side arranged in a straight line, ad_2 being closer to ad_1 than to ad_3. Adanal fissures obliquely aligned.

Legs : Legs I, II, III and IV nearly equal in length. Femora II-IV each provided with a plate-like ventral appendage. Chaetotaxy (Ta-Ti-Ge-Fe) — I : 19-5-4-5, II : 16-5-4-4, III : 13-4-2-2, IV : 10-4-2-2. Femora and tibiae of legs I-IV have several ring-like structures (Fig. 7) which are arranged close together ; the number of the structures are 5 on FeI and FeII, 3 on FeIII and FeIV, 2 on TiI, TiII and TiII, and 1 on TiIII. Trochantera, genua and tarsi lacking in such structures. Tarsi heterotridactyle, the median claw thicker and shorter than the lateral ones.

Chelicerae : Fixed digit with 4 teeth ; movable digit appears to have 3 teeth, but the anteriormost as well as the posteriormost tooth is doubled. Setae *cha* and *chb* nearly equal in length, both the setae being roughened ; *chb* almost reaching the tip of fixed digit.



FIGS. 7-11 : *Coropoculia reticulata* gen. nov. et spec. nov. ; 7 : Femur I with " ring-like structures " ; 8 : Trochanter IV and femur IV ; 9 : Tarsus I ; 10 : Epimeral and pedotectal region (right side) ; 11 : Ventral aspect.



FIGS. 12-15 : *Coropoculia reticulata* gen. nov. et spec. nov. 12 : Stereoscan electron micrographs of ventral side ; 13 : Bothridial region (left side) ; 14 & 15 : Surface sculptures near the central part of notogaster. (Photo by Drs. ISHIDA and OYA, of *Hokkaido UNIV.*)

COMPARISON OF SOME RELATED GENERA WITH *Coropoculia*

As stated on the top of this paper, the genus *Coropoculia* exhibits the important features of the both families Charassobatidae and Cymbaermaeidae. A comparison of the genus is made below with 2 genera of Charassobatidae, 3 genera of Cymbaeremaeidae and also 1 genus of Micreremidae.

Charassobates : In having convergent lamellae, distinct humeral projections and dorsosejugal suture interrupted medially, *Charassobates* is related to *Coropoculia*, but it is different from the latter in many important features, such as slender chelicerae, genital and anal opening enough

separated, elongate sensilli elbowed near the base, 5 pairs of genital setae and monodactylity. The presence of peculiar notogastral cavernae is also one of the most characteristic feature of the genus, if we deal with *C. cavernosus* GRANDJEAN, 1929 and *C. ornatus* BALOGH et MAHUNKA, 1969, but the remaining 1 species, *C. simplex* BALOGH et MAHUNKA, 1969 has no such cavernae against expectation.

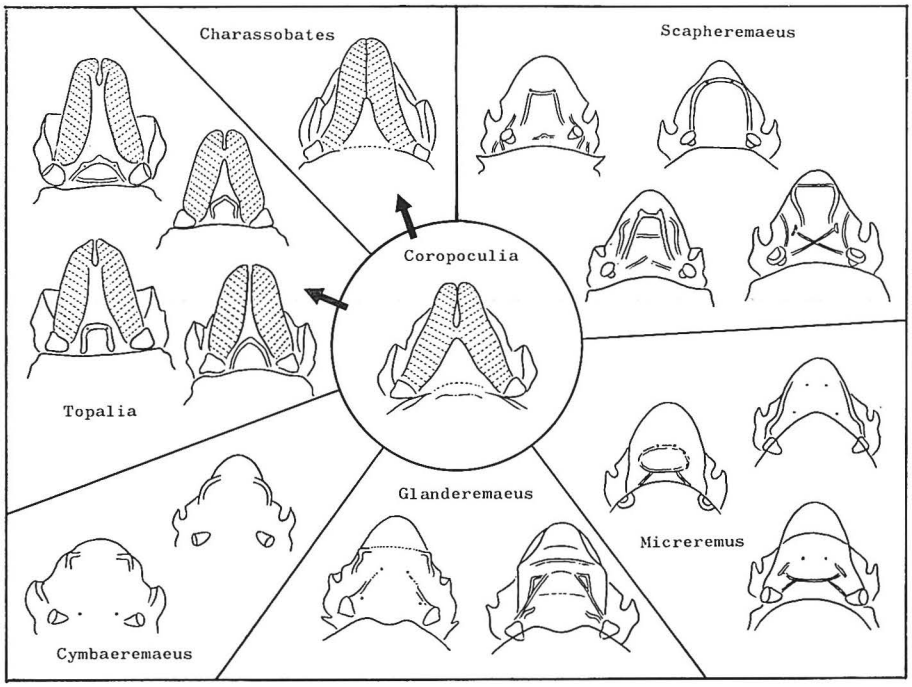


FIG. 16 : Prodorsum of *Coropoculia* and its related genera.

Topalia : Convergent lamellae, notogaster without cavernae, normal chelicerae and clavate sensilli — the combination of these characters indicates a more close relationship of *Topalia* to *Coropoculia*. The distinctive differences are in that *Topalia* has 4 pairs of genital setae, aggenital condyles, notogastral laths (1 transverse and 2 longitudinal ones) and only one claw on each leg. Humeral projection of *Topalia* is rather trapezoidal with two rounded protrusions, while in *Coropoculia* this structure is smoothly rounded.

Cymbaeremaeus : Except for the absence of prominent convergent lamellae, *Cymbaeremaeus* is most similar in many features to *Coropoculia*, especially in the ventral plate which is pointed posteriorly and largely covered laterally by bending notogaster, in the shape and location of anal aperture, in the number of genital setae and in the surface sculpture of body. Both the genera have 3 claws on each leg, but these are homodactyle in *Cymbaeremaeus* and heterodactyle in *Coropoculia*.

Scapheremaeus : Though the shape of sensilli is quite similar to those of *Coropoculia*, the genus *Scapheremaeus* is fairly different in many respects from the latter. Above all, the presence of oval middle field on notogaster, light area near the anterior margin of notogaster, genital and anal opening widely separated and ventral plate rounded posteriorly — these features well distinguish the genus from *Coropoculia*. Number of genital setae seems to be 4-4 or 6-5 and the tarsi are tridactyle or heterodactyle. Of course, distinct lamellae are absent.

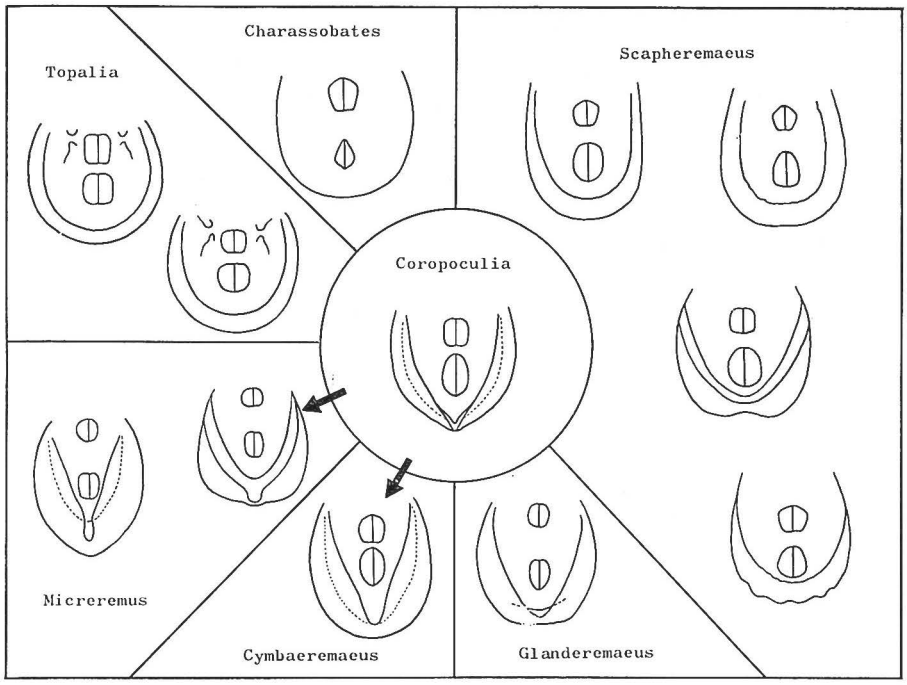


FIG. 17 : Ventral side of opisthosoma of *Coropoculia* and its related genera.

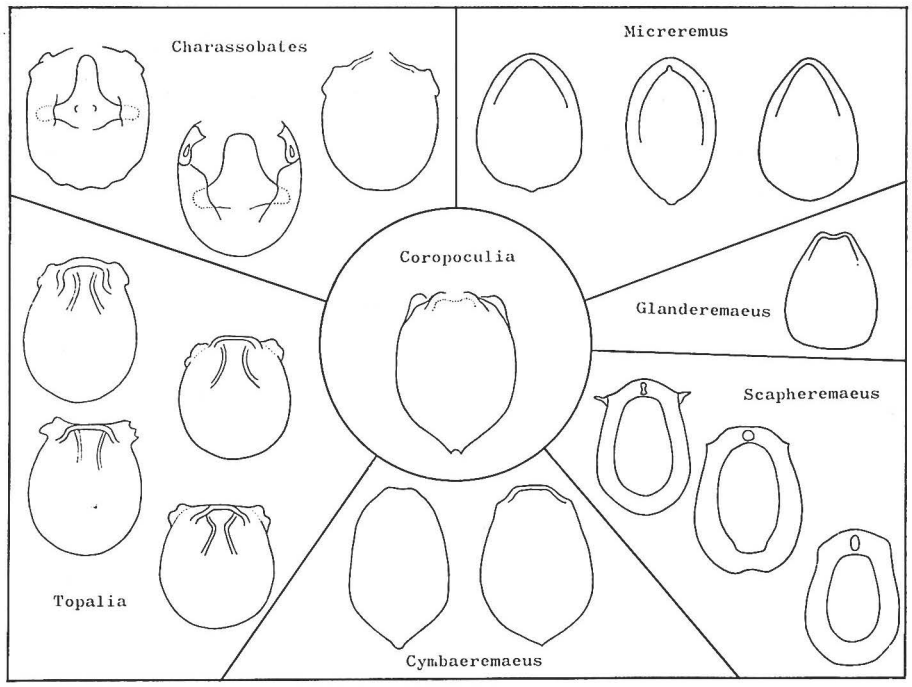


FIG. 18 : Shape of notogaster of *Coropoculia* and its related genera.

Glanderemaeus : The presence of a pair of posteromarginal glandulae distinguishes the genus from all other known oribatids. Examining the figures of *G. hammerae* (a single representative of the genus) by BALOGH & CSISZÁR, 1963, notogaster seems to cover the lateral sides of ventral plate. In this respect and in the number of genital setae, *Glanderemaeus* has resemblance to *Coropoculia*, but easily distinguishable from this genus by anal and genital openings widely separated, the absence of well developed lamellae and humeral projections, ventral plate not pointed posteriorly, and heterodactylity of tarsi.

Micreremus : In the ventral aspect, *Micreremus* bears a resemblance in the shape of ventral plate and the surrounding notogastral margin. Important differences of *Micreremus* from *Coropoculia* are anal opening which is rectangular and widely separated from genital one, 4 pairs of genital setae, conspicuously large lyrifissures and the anterior notogastral margin convex.

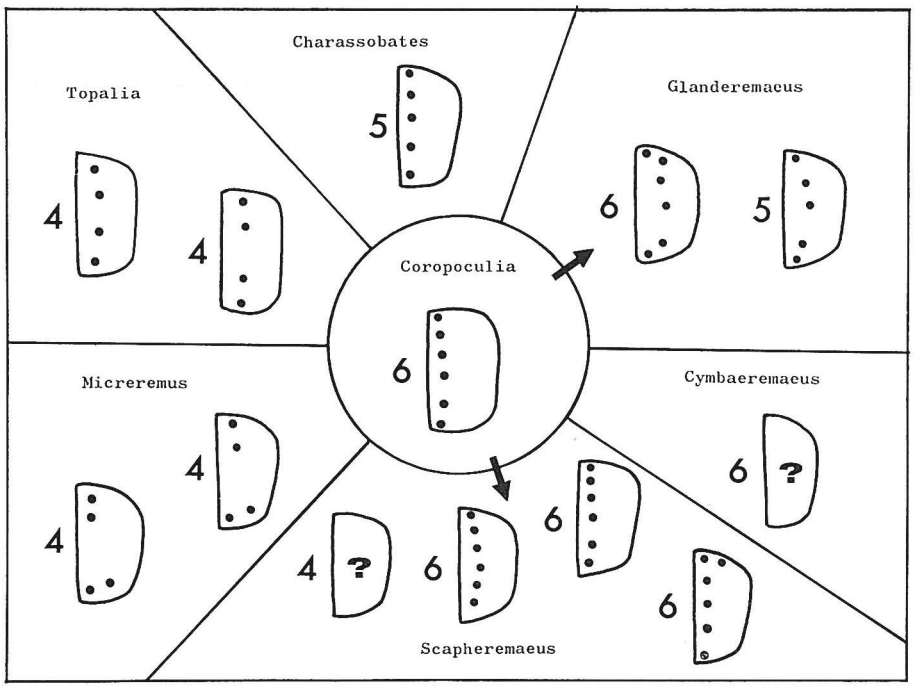


FIG. 19 : Genital plate of *Coropoculia* and its related genera.

MOSAIC GENUS

As the result of comparisons above-mentioned, the genus *Coropoculia* can not be placed in any of the genera of the families Charassobatidae, Cymbaeremaeidae and Micreremidae. As partly expressed in Figs. 12-16, however, *Coropoculia* shows resemblances in various respects to each of the genera compared, especially to *Charassobates*, *Topalia* and *Cymbaeremaeus*. If we highly evaluate the character of lamellar structure, the genus *Coropoculia* should be included in the family Charassobatidae. However, if the other characters, especially the structures on the ventral aspect, are considered to be more important, it no doubt is a member of the family Cymbaeremaeidae. In the present case it is difficult to consider that one character is more important than the other. Both the characters used to be dealt as those valuable for classification

of family rank in Oribatei. It is not uncommon that we meet with such a case and fall into a difficulty in taxonomical arrangement of genus in question. Such a genus is called here provisionally a " mosaic genus ", in the present case a mosaic genus of *Cymbaeremaeus* and *Charassobates* (or *Topalia*). It is, of course, a tentative status and the calling " mosaic genus " should in nature be withdrawn after the future study which will indicate one of the following treatment (M as a " mosaic genus " of genera A and B) :

(1) M and B is considered synonyms of the senior genus A and both included in A, because M shows an intermediate condition between A and B and all the three genera are continuous in nature. (A, M, B → A).

(2) M is considered a synonym of A and included in A, because a character of M common to A is more highly evaluated than the other character common to B. (A, M, B → A, B).

(3) M remains as it is, because M is considered a genus independent from any of A and B. If A and B belong to separate families, a new family is to be established for M.

The genus *Coropoculia* is called a " mosaic genus " in this meaning above-mentioned and its accurate taxonomical treatment, (1), (2) or (3), will be determined in a future. Thus, the significance of founding of a " mosaic genus " is rather in that it is a caution that the current interpretation of the genus (or genera) concerned should be re-newed or the current taxonomical arrangement of taxon should be changed.

TENTATIVE CONCLUSION

For the reasons we mentioned above, it is quite difficult to place the genus *Coropoculia* in a reasonable position in the present classification of Oribatei. But, in a taxonomical publication, we consider, it is undesirable that a new genus is mentioned without relation to the family, to which it belongs. A new taxon without " registration " is often difficult to be cited in future works. So, we decided here to adopt the second one among the possible three treatments mentioned before and to place the genus *Coropoculia* tentatively in the family Charassobatidae. The reason for it is that the presence or absence of lamellae may be considered, in the current arbitrary system of oribatid classification, to be more important character than the remaining features.

Key to the genera of the family Charassobatidae.

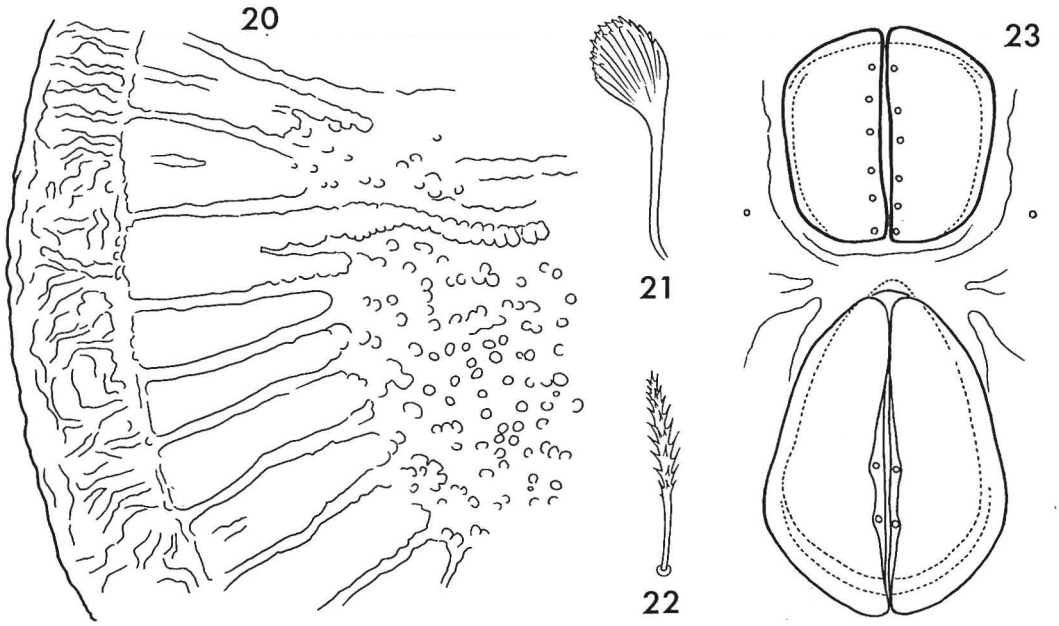
1. Lateral sides of ventral plate partly covered by bending notogaster ; genital plate with 6 setae ; legs heterotridactyle ..... **Coropoculia** gen. nov.
— Lateral sides of ventral plate not covered by notogaster ; genital plate with 4 or 5 setae ; legs monodactyle 2
2. Genital plate with 5 setae ; aggenital condyles absent ; notogaster often with a pair of deep cavernae.. **Charassobates** GRANDJEAN, 1929
— Genital plate with 4 setae ; aggenital condyles present ; notogaster with 1 transverse and 2 longitudinal laths..... **Topalia** BALOGH & CSISZÁR, 1963

ADDITIONAL MEMBER OF THE GENUS *Coropoculia*

Coropoculia lamellata (SCHWEIZER, 1956), comb. nov.
(Figs. 20-23)

SCHWEIZER (1956) described from Switzerland *Cymbaeremaeus lamellata* which is now obviously an another member of the genus *Coropoculia*. At that time, he was not sure that the presence

of lamellae and humeral projections are real structures or merely the rest of nymphal skin. On the end of summer, 1971, one of the authors (AOKI) had a chance to visit the Natural History Museum in Basel and through the courtesy of Dr. Carl BADER he could examine the type material of *Cymbaeremaeus lamellata* SCHWEIZER. The most distinct difference between *Coropoculia reticulata* and *C. lamellata* is the surface structure on notogaster ; that of *C. lamellata* is divided into 3 parts, i. e. the central areolate field, the surrounding field with radiating ridges and the marginal field with irregular wrinkles (Fig. 16), while that of *C. reticulata* is evenly reticulated. In addition, the structures of sensilli and lamellar setae are somewhat different between the two species (Figs. 4, 5, 21 and 22). The ano-genital region of *C. lamellata*, though SCHWEIZER gave no description about it, is fundamentally the same as that of *C. reticulata* ; there are 6 pairs of genital, 2 pairs of anal and 1 pair of aggenital setae, but adanal fissures could not be detected on the specimens re-examined.



FIGS. 20-23 : *Coropoculia lamellata* (SCHWEIZER) ; 20 : Surface sculpture on notogaster ; 21 : Sensillus ; 22 Lamellar seta ; 23 : Ano-genital region. (after the type-specimens in Basel).

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