*Rec. zool. Surv. India* : **100** (Part 3–4) : 67–72, 2002

# STATUS OF *MICROPARONELLA* CARPENTER, 1916 (COLLEMBOLA : ENTOMOBRYIDAE : PARONELLINAE)

S. K. MITRA
*Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053*

## INTRODUCTION

The genus *Microparonella* includes smaller species hardly exceeding the length of 1 mm. The genus was established by Carpenter (1916) with the type-species *Microparonella caerulea*. In the same paper he also described the other new species *viz.*, *Microparonella flava*. *Microparonella* is distinct from *Paronella* and *Dicranocentruga* owing to its relatively smaller size, absence of extra ocular structure, less than 8 ocelli on each side, structure and nature of ungues and unguiculi, 2 rows of minutely ciliated dental spines and nature of mucrones. Further, the species of *Paronella* and *Metaparonella* possess the larger rounded or oval body scales with visible striations in contrast to *Microparonella* where the scales are always smaller and completely hyaline like the scales of some genera under Cyphoderinae. Salmon (1964a, b) synonymised the genus *Microparonella* with *Paronella*. The present investigation proves it to be a genus distinctly related to *Paronella* or *Dicranocentruga* and is distinct from the above mentioned genera in every detail. Denis (1925) considered *Microparonella* visibly more evelved and distinct from *Paronella*. He further commented that *Microparonella* possesses more evolved mucrones than *Paronella*. *Microparonella* is very distantly related to *Pseudoparonella* in having more differences than resemblances. Carpenter (1932), however, was misguided by the diagnosis of *Pseudoparonella* given by Handschin (1924) and he (Carpenter, 1932) attributed importance only on the character like bidentate mucro of the species *doveri* for placing it under the genus *Pseudoparonella*. Diagnosis of *Pseudoparonella*, as it has already been mentioned, was based actually on the species like *setigera* and *incerta*. Handschin (1924) fixed *P. appendiculata* (Schott) of the as the type-species of *Pseudoparonella*. *Microparonella* is distinct from *Bromacanthus* in the nature of dental spines (which are minutely ciliated and transiting distally in *Microparonella vs.* smooth, usually non-transiting stout spines in *Lepidonella* and *Bromacanthus*),number and nature of arrangement of ocelli, nature of scales clothing body and in the relative length of body and body facies. Nature of ungues and unguiculi with its teeth also exhibit distinct differentiation in the two genera. Yosii (1966) described a new species *viz.*, *Microparonella ceylonica* from Ceylon which should better be included under *Lepidonella* in view of the nature of its mucrones, ungues and unguiculi, dental spines and in the number and nature of arrangement of ocelli. Moreover, the body facies of the species is more lepidocyrtiform than cyphoderiform. The species of the

genus exhibit a sort of cavernicolous or euedaphic adaptation which is indicated by its usually non-pigmented, cyphoderiform body facies, tendency towards the reduction in the number of ocelli, nature of foot complex, specially in the tendency of enlargement of ungual teeth (sometime reduction also) and in the modification of tenent hair as shown by Christiansen (1965) for the cave-forms. Variable number of ocelli and ungual teeth together with the enlargement or reduction of the paired inner basal ungual teeth indicate that the species of the genus are plastic with the abilities to adapt to various ecological niches.

*Redefinition* : Body covered with smaller, rounded to oval, hyaline typical scales without visible striations; antennae shorter, rarely sub-equal to the length of body; ocelli reduced; ungues and unguiculi elongate, slender, paired inner ungual teeth enlarged or reduced, unpaired distal teeth present or absent, external basolateral teeth vestigial; unguiculi lanceolate, nondentate; tenent hair slender, usually setaceous; manubrium without spines, dentes with two rows of stiff, minutely ciliated spines (Carpenter in his original diagnosis mentioned only one inner row of spines); mucro slender, elongate, with two prominent ridges, reduced with 2 teeth or well developed with 4 teeth, inner lateral tooth separated and runs parallel with anteapical tooth in the form of a separate ridge; Th. II not elevated; in body facies the species of the genus come close to members of Troglopedetini under Cyphoderinae.

*Type-species* : *Microparonella caerulea* Carpenter, 1916, by original designation.

## DESCRIPTION OF THE TYPE-SPECIES

### *Microparonella caerulea* Carpenter, 1916

1916. *Microparonella caerulea* Carpenter, *Proc. Roy. Irish Acad.*, **33B** : 1-70.

1929. *Paronella caerulea* Handschin, *Trans. Ent. Soc., London*, **77** : 15-28; Salmon, 1964b, *Bull. Roy. Soc. N. Z.*, (7) **2** : 145-644.

*Material* : Syntype mounted on a slide from the British Museum (Natural History), London, labelled as "Mahé, Seychelles, Forêt Noire. X.1908. B.M. 1916-183 [P. V. A; J. T. S., 8. 1951]"

*Colouration* : Violet blue (as mentioned by the author), the syntype examined totally non-pigmented; ocellar fields reduced, faintly pigmented (Text figs. 1.A, B; PL. 1.A).

*Clothing* : Clothed with smaller hyaline scales, scales with rounded apices, oval or elongate in outline without darker striations (typical scales); flexed macrochaetae absent on the general surface of body (achaetoic); Th.II on anterior margin and Abd. IV occasionally with a few setae; appendages clothed with ciliated acuminate setae.

*Head* : Ocelli 3 + 3 ( as mentioned by the author), in the syntype examined, however, it appears to be 4 + 4 (Text figs. 1. A, B); in the syntype Ants. II, III and IV broken, from Ant. I it appears, antennae shorter than body; relative length index of Ants. I II : III : IV (as given by Carpenter) = 5 : 9 : 9 : 12.

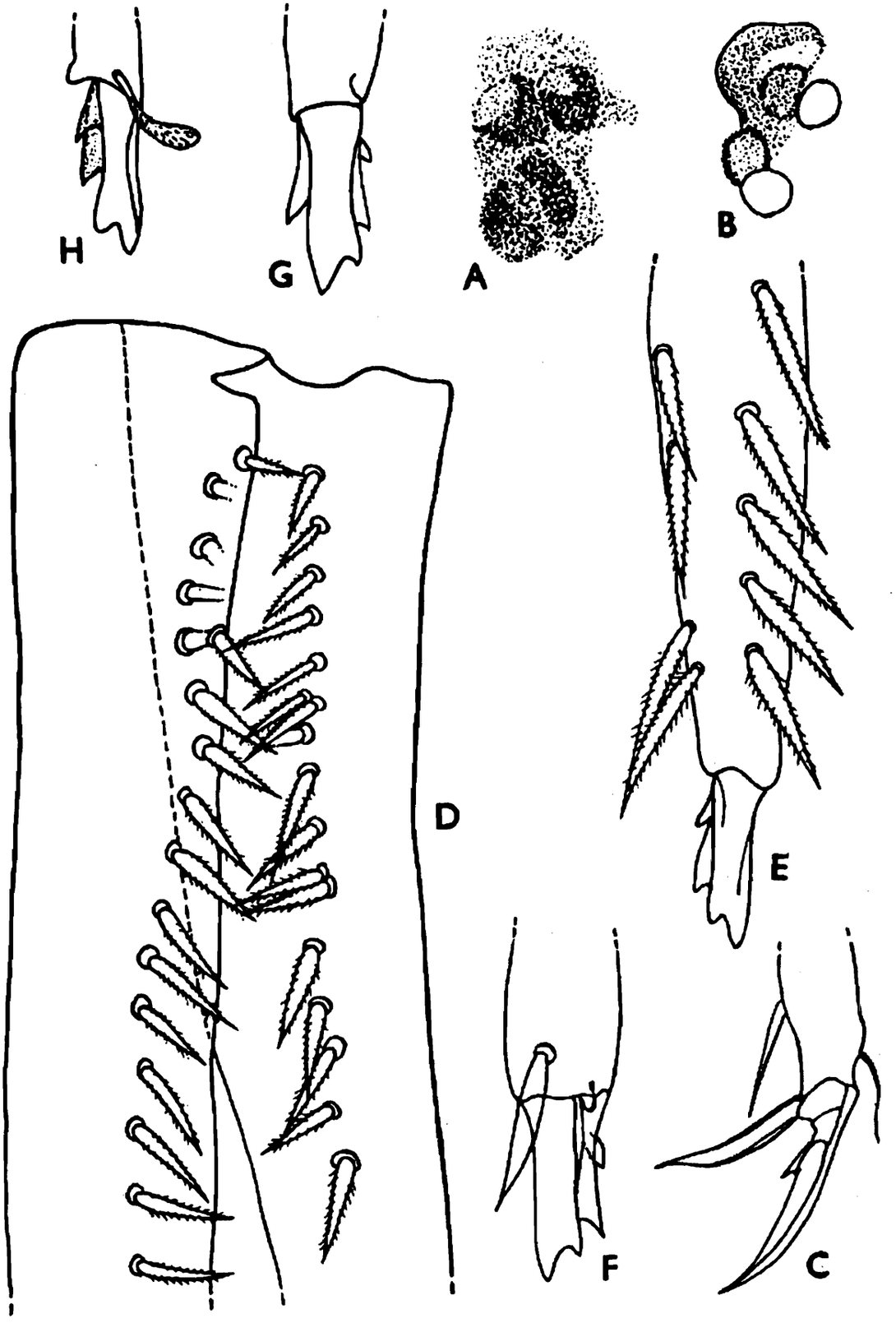



**Fig. 1.** *Micropaonella caerulea* Carpenter : (A) left ocellar field; (B) right ocellar field; (C) footcomplex of leg II; (D) proximal portion of dentes showing arrangement of spines; (E) distal portion of dentes with mucrone showing arrangement of spines; (F–G) mucrones in different views (All drawn from a syntype).

*Thorax* : Metathorax longer than mesothorax; legs all similar, ungues slender, with paired inner basal teeth, of which the outer basal tooth enlarged, distal unpaired inner teeth absent; unguiculi long, slender, lanceolate and non-dentate; tenent hair present (Carpenter, 1916, considered it as absent), setaceous (Text fig.1,C).

*Abdomen* : Abd. IV thrice and a half the length of Abd. III; furcula well developed, dentes longer than manubrium with two rows of minutely ciliated spines (Text fig.1, D, E); mucro elongate with 4 teeth, *viz*., apical, anteapical, inner lateral and basolateral, i.l. runs parallel with ant.ap. (Carpenter, 1916, in his description mentioned 5 teeth in mucro and he depicted a relatively shorter mucro than what is seen in the syntype; he depicted a tooth, termed as "ventral" which is nothing but the terminal thickening of the apical tooth and the tooth he had mentioned and depicted as "lateral", not observed in the syntype examined) (Text figs.1. F, G, H).

*Length* (excluding appendages) : 1 mm

*Type-specimens* : Syntypes in the British Museum (Natural History), London.

*Type-locality* : Mahé, Forêt Noire, Seychelles.

*Comparisons* : The species can be discriminated from the other species by the reduced number of ocelli and in the nature of its mucrones and foot complex.

*Interrelationships* : Phylogenetically *Microparonella* appears to be quite an aberrant group in the absence of striking resemblance to any genus under Paronellinae. It, however, possesses certain characteristics which resemble more to the genera under the tribe Troglopedetini. Thus the nature of mucrones (in certain species) and the presence of spines on dentes together with the reduction in the number of ocelli make the genus apparently related to some genera of Troglopedetini and specially to *Cyphoderopsis* Carpenter (1917). Its smaller size, reduced pigmentation, body facies and other features are similar to those of euedaphic or cave species.

*Distribution* : The genus, as the present knowledge stands, is restricted in the Oriental Region. Thus three species viz., *Microparonella caerulea* Carpenter, *Microparonella flava* Carpenter and *Microparonella doveri* (Carpenter) are known from the Oriental Region. One species viz., *Paronella berlandi* Denis 1925, described from South America, may be a member of this genus.

## Species included

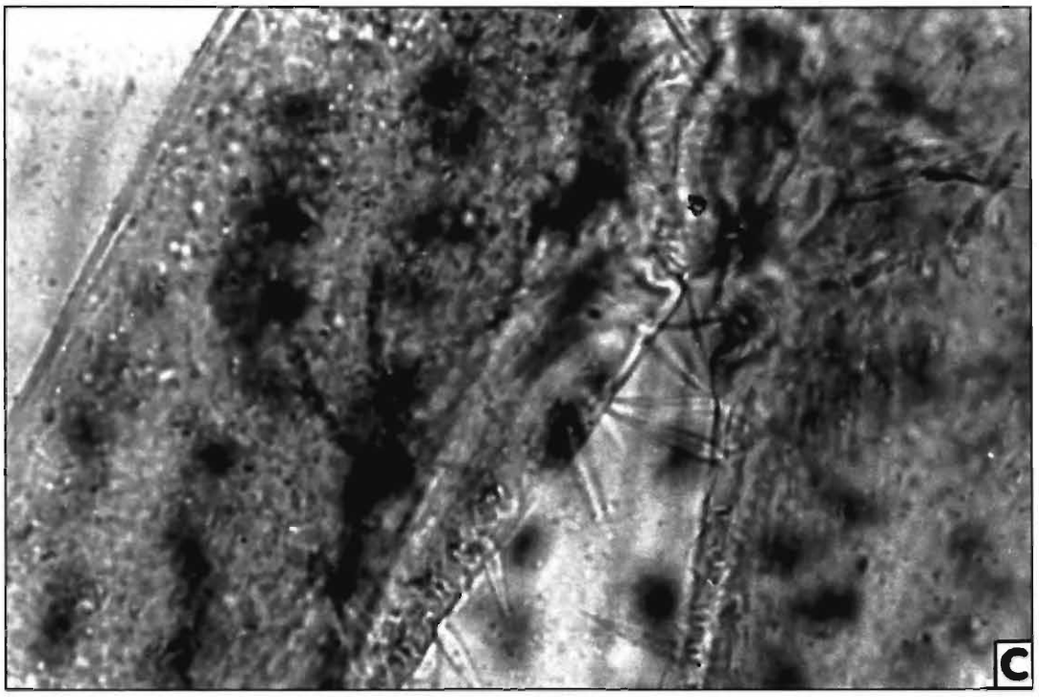
Though, *M. flava* and *M. berlandi* resemble to the other species of the genus in many salient features, the exact number of ocelli present in them needs verification. They are, therefore, tentatively included in this genus.

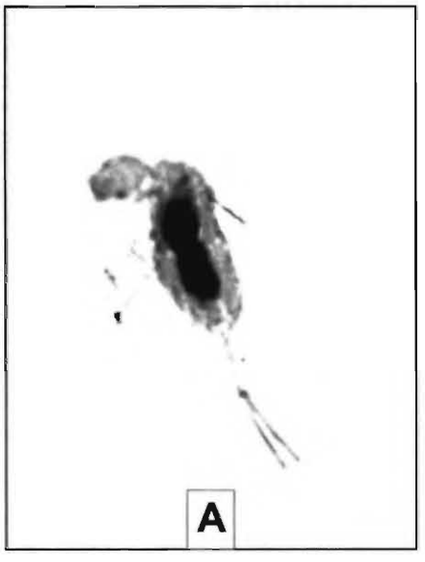
*Microparonella caerulea* Carpenter, 1916.

*Microparonella flava* Carpenter, 1916.

*Microparonella berlandi* (Denis) 1925, new combination.

*Microparonella doveri* (Carpenter) 1932, new combination.



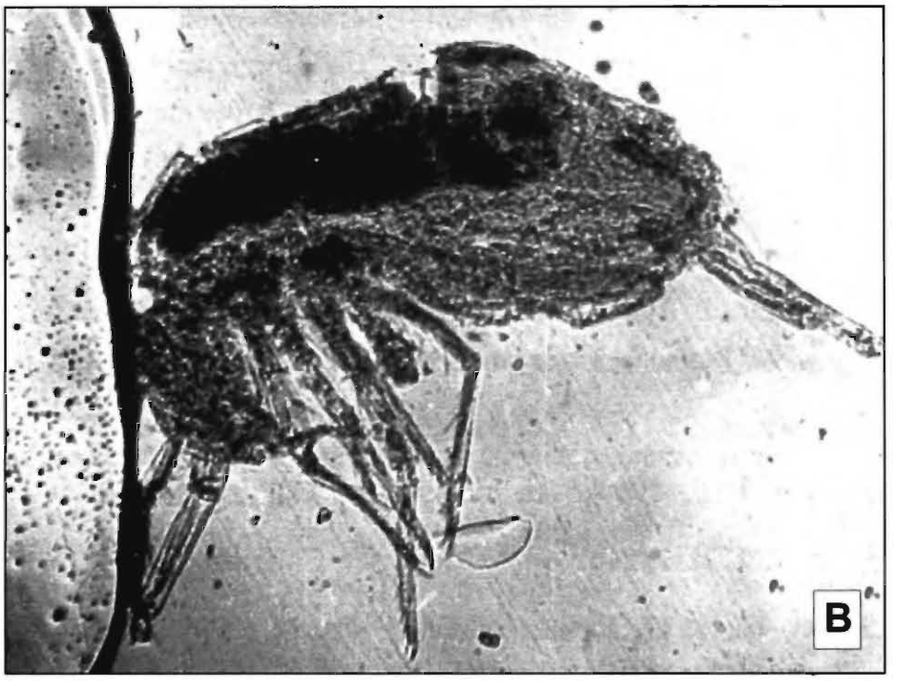




**PLATE 1.** Photomicrographs showing profile and structural details of *Micrparonella caerulea* Carpenter and *Microparonella doveri* (Carpenter), new combination.
(A) profile of *M. caerulea* (syntype);
(B) profile of *M.doveri* (Carpenter) [paralectotype];
(C) proximal portion of dentes showing spines in *M. doveri* (lectotype).

## SUMMARY

The concept of *Microparonella* Carpenter, 1916 is precised on the basis of examination of the type specimens of the type-species and other species included under *Microparonella* in this study.

## ACKNOWLEDGEMENTS

I am grateful to the authorities of the British Museum (Natural History), London and the Manchester University Museum, England for providing me an opportunity to study the type material of the species, dealt with in this investigation.

Thanks an also done to Dr. J. R. B. Alfred, Director and Dr. G. K. Srivastava, Additional Director of this organization for numerous courtesies.

## REFERENCES

Carpenter, G. H., 1916. The Apterygota of Seychelles. *Proc. Roy. Irish Acad.*, **33** (B) : 1-70.

Carpenter, G. H., 1932. Fauna of the Batu Caves, Selangor. XVII, Apterygota. *J. F. M. S. Museum, Kualalumpur*, **17** : 217-221.

Christiansen, K., 1965. Behaviour and form in the evolution of Cave Collembola. *Evolution*, **19**(4) : 529-537.

Denis, J. P. 1925. Sur les Collembola du Museum de Paris, II. *Ann. Soc. Ent France*, **94** : 261-290.

Handschin, E. 1924. Neue Myrmecophile and territophile Collembolen-formen and Sud-Amerika. *N. Beitr. Syst. Insektenk., Berlin*, **3** : 13-19.

Handschin, E., 1929. Collembola from Abyminia. Trans. *Ent. Soc. London*, **77** : 15-28.

Salmon, J. T., 1964a. An Index to the Collembola. *Bull. Roy. Soc., N. Z.*, (7)**1** : 1-144.

Salmon, J. T. 1964b. An Index to the Collembola. *Bull. Roy. Soc., N. Z.*, (7)**2** : 145-644.

Schött, H., 1917. Results of Dr. Mjöbergs Swedish Scientific Expeditions to Australia, 1910-1913, (15) : Collembola. *Ark. Zool*; **11**(8) : 60 pp.

Yosii, R. 1966. On some Collembola from Afghanistan, India and Ceylon, Collected by Kuphe Expedition 1960. *Res. Kyoto Univ. Sci. Exped. Karakoram and Hindukush*, M55, **8** : 333-405.