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**Rick, E. F.**

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# AN ENTOMOBRYID COLLEMBOLAN (HEXAPODA: COLLEMBOLA) FROM THE LOWER PERMIAN OF SOUTHERN AFRICA

by

**E. F. Riek**
*C.S.I.R.O. Division of Entomology,*
*P.O. Box 1700, Canberra City A.C.T. 2601.*

**ABSTRACT**

*Permobrya mirabilis* gen. et sp. nov., recorded from carbonaceous shales of the Middle Ecca of southern Africa, is a rather large entomobryid collembolan. The specimen, preserved in lateral view, is complete except for the dentes and mucrones of the furcula and details of the claws which are not visible in the shale matrix. The species is surprisingly similar to Recent Collembola.

## INTRODUCTION

Collembola are such fragile animals that they are rarely preserved as fossils, except in amber. *Rhyniella praecursor* Hirst and Mulik 1926 from the Middle Devonian Rhynie Cherts of Scotland is the only recorded Palaeozoic species that is almost certainly a collembolan. Tillyard (1928) was of the opinion that the species was a collemboloid hexapod but until the segmentation of the abdomen is known he refrained from placing the species definitely in the Collembola. From a study of additional specimens in which head, thorax and basal segments of the abdomen are preserved Scourfield (1940) concluded that *Rhyniella praecursor* was a true Collembolan that combined podurid and entomobryid characters.

An almost complete collembolan was discovered by the writer in carbonaceous shales of Middle Ecca age at Hammanskraal, near Pretoria, southern Africa. The specimen and counterpart were recovered from fragments of a slab of rock damaged in transit through the mails. This sample had been sent for detailed study of an insect nymph discovered by Dr. Éva Kovács-Endrödy during a study of the plant fossils in the shales.

The collembolan is clearly preserved in lateral view to show most of the diagnostic characters of the Entomobryidae: only the structure of the pronotum, details of the tarsal claw and the structure of the dentes and mucrones are unknown. The species combines characters of a number of Recent genera. There are no characters unique to the fossil species.

### Order Collembola

### Family Entomobryidae

*Diagnosis*

Most of the thoracic and abdominal segments distinctly defined. Pronotum completely hairless, often concealed under the mesonotum. Body scaled or with at least dense ciliated club-shaped setae. Segment 4 of abdomen usually much longer than segment 3. Furcula always well developed.

The family has a world-wide distribution. The species are often amongst the largest of the Collembola, with length up to 10 mm.

A species from the Lower Permian of southern Africa is referred to the family.

### Genus *Permobrya* gen. nov.

*Type species. Permobrya mirabilis* sp. nov.

*Diagnosis*

It is not possible to give a valid generic diagnosis because Recent genera are defined largely on the dentes, mucrones and claws and the structure of these parts is not known in the fossil. However, the genus is similar in general appearance to *Lepidosira* and *Lepidocyrtus* except that the legs are rather short and stout, the eyes are not distinctly defined (or preserved) and the fourth antennal segment is annulated. In this last character the genus resembles *Mesira* and *Lepidocyrtoides*.

Although the structure of the dentes, mucrones and claws is not known, the presence of scales on the body and the long fourth abdominal segment leaves no doubt that the genus is correctly referred to the Entomobryidae.

### *Permobrya mirabilis* sp. nov.

Figures 1 – 4

*Type*

HI 248 a, b, in Geological Survey, Pretoria.

*Type locality*

North-western corner of the farm Haakdoornfontein 119 JR, 7,25 km almost due south of Hammanskraal, near Pretoria, Africa, in carbonaceous shale of Middle Ecca age.

*Description*

Lateral view of whole animal. Length without furcula *c.* 4,5 mm. Outline of head, viewed from in front, vague. Antennae both preserved, inserted close together, one mostly overlying the head, the other fully exposed and distinct. Antennae 4-segmented, all

segments long, increasing regularly in length, terminal segment slightly more than twice as long as first, distinctly wider than basal segments as preserved and annulated, with 7 or 8 annuli. Mesonotum distinctly sclerotised, lateral margin obscured by overlying antenna. Metanotum slightly shorter than mesonotum, lateral margin apparently convex. First two segments of abdomen very short, each about half as long as metanotum, and extending laterally only as far as metanotum. Segment 3 about as long as 1 and 2 combined, lateral margin ill-defined. Segment 4 large, as long as basal three segments combined, sclerotisation apparently extending to ventral margin of the body as preserved. Apical segment or segments about as long as high. Furcula distinct but only manubrium preserved: manubrium long and stout, almost as long as terminal segment of abdomen. Ventral tube distinct, about twice as long as wide. Two legs preserved, one apparently a hind leg, the other possibly a fore leg, with proportions differing in the two legs. Combined coxa plus trochanter of (fore?) leg about as long as femur. Tibiotarsus somewhat shorter and narrower than femur. From the irregular outline of the dorsal margin of the body it would appear that the body was covered with scales.

*Note.* It is surprising that this species of such great age should resemble Recent Collembola so closely.


## ACKNOWLEDGEMENTS

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## REFERENCES


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Figures 1–4. *Permobrya mirabilis*. 1 and 3: Untouched photographs. 2 and 4: Retouched photographs.

(For overall size, see text page 141.)