

The first Gondwanan *Epimastax* from the Lopingian of KwaZulu-Natal, South Africa (Insecta: Palaeomanteida = Miomoptera: Permosialidae)

A. P. Rasnitsyn¹ and D. E. van Dijk²

¹A.A. Borissiak Paleontological Institute, Russian Academy of Sciences, 117997 Moscow, Russia, and Natural History Museum, Cromwell Road, London SW7 5BD, UK; rasna36@yahoo.com

²Department of Zoology, University of Stellenbosch, P. Bag X1, Matieland, 7602 South Africa; eddie@vandijks.com

ABSTRACT

Epimastax hesteriae sp. n. is described from the Lopingian deposits of the Tarkastad Subgroup of the Beaufort Group. All described congeners are known from the Lower and Middle Permian (Sakmarian, Kungurian and Kazanian) of Central and East Europe.

KEY WORDS: Palaeomanteida, Miomoptera, Permosialidae, *Epimastax*, Gondwana, Permian, Lopingian, new species.

INTRODUCTION

The Permian genus *Epimastax* Martynov, 1928 has a rather complicated taxonomic history. It was described from the Biarmian (= Middle Permian) (Lower Kazanian) deposits of eastern European Russia as a type of the family of its own within the order Protoblattodea next to the family Oryctoblattinidae (= Blattinopseidae) (Martynov 1928). This treatment was adopted by Sharov (1962). The second species *E. celer* Kukulová, 1965 was described from the Cisuralian (= Lower Permian) (Sakmarian) of Central Europe in the same family, at that time attributed to the order Protorthoptera (Kukulová 1965). This attribution was followed by Carpenter (1992). The third species from the Middle Permian of north European Russia was described under the name *Sindomioptera soyanensis* Rasnitsyn, 1977 in the family Permosialidae (order Miomoptera = Palaeomanteida). *Sindomioptera* was shortly afterwards synonymized under *Epimastax* (Rasnitsyn 1980). Later Rasnitsyn (in Rasnitsyn *et al.* 2004) transferred the genus from the Permosialidae to Palaeomanteidae but then he returned it back to Permosialidae (Rasnitsyn & Aristov, in press). The present description of a new finding in the Lopingian of South Africa considerably extends both the stratigraphical and geographical range of the genus.

MATERIAL AND METHODS

The fossil under description was collected by the junior author in a quarry in the town of Bulwer in KwaZulu-Natal, South Africa. It is kept in the KwaZulu-Natal Museum, Pietermaritzburg, South Africa (NMSA). The deposits are identified as the Normandien Formation, Tarkastad Subgroup, Beaufort Group, which is considered the uppermost in the South African Permian (Dijk 1997; Gastaldo *et al.* 2005). The stratigraphy and palaeoenvironment of this locality are discussed by Gastaldo *et al.* (2005). The photograph was taken by DEvD using a Nikon D70 camera body mounted on Nikon PB4 bellows with a Nikon E2 ring to permit wide-open focussing of a Nikkormat 50 mm lens. The line drawing is prepared by APR based on the photograph and using CorelDraw 12 software.

TAXONOMY

Order Palaeomanteida (= Miomoptera)

Family Permosialidae Martynov, 1928

Genus *Epimastax* Martynov, 1928

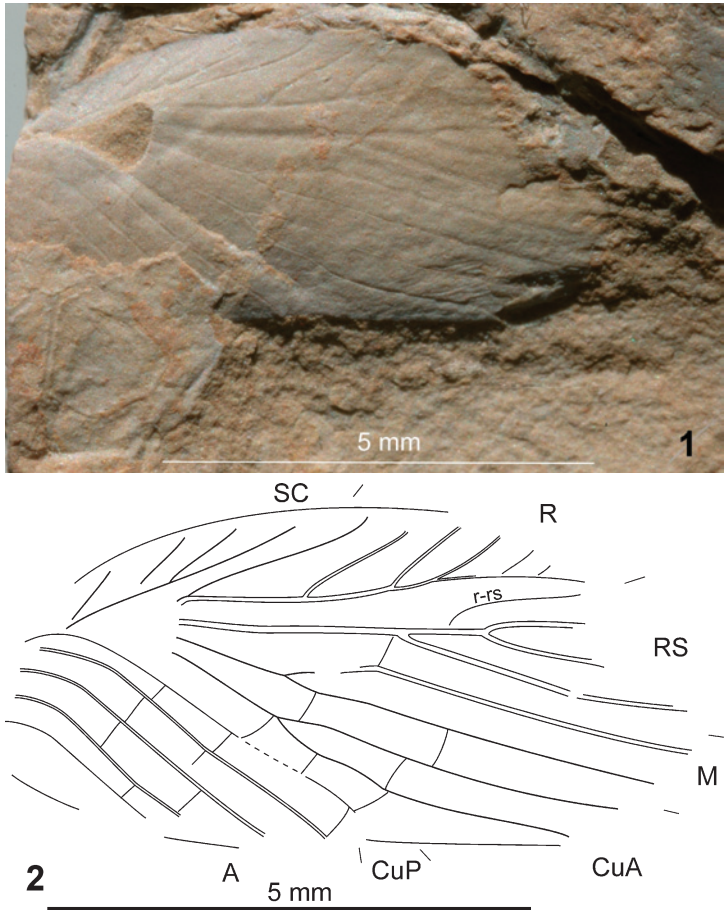
***Epimastax hesterae* sp. n.**

Figs 1, 2

Etymology: The species name is in memory of Mrs Hester Heese-Van Dijk, who collected fossils, including insects, in Bulwer and at other sites in the South African Permian.

Description:

Forewing length 6.8 mm as preserved, width 3.5 mm. Forewing convex, with fore margin apparently convex, R, RS, M₁ and, to much lesser extent, anal veins inflated. SC short (only reaching level of M and CuA forks), almost straight, with three oblique, spaced, almost straight, visible preapical branchlets (probably only one or none mis-



Figs 1, 2. *Epimastax hesterae* sp. n., holotype NMSA 2737: (1) left forewing, laterally inverted; (2) venation details. Venation symbols are standard.

sing). R slightly sigmoid, with oblique fore branchlets (of which six visible), basal one very long (at least half as long as SC), slightly sinuate, followed by slightly bent, gradually shortening ones. RS apparently connected to R with long, oblique, sinuate r–rs crossvein, and with three branches preserved, first forking well beyond SC apex. M and CuA forking well before RS, with forks long, parallel-sided. Clavus long (reaching or slightly surpassing level of SC apex), wide, with four simple, parallel anal veins visible. Crossveins (other than r–rs) spaced as preserved, subvertical, rarely causing distinct bends of main veins. Colour pattern absent or not preserved.

Comparison: Strikingly different from all congeners in having R with a very long basal fore branch and with long, sinuate r–rs crossvein.

Holotype: NMSA 2737, almost complete but somewhat damaged forewing, with fore and hind margins partially, and apical margin entirely, missing, a sub-basal portion of membrane lost, and the fore margin of clavus overlapping posterior margin of remigium. SOUTH AFRICA: *KwaZulu-Natal*: Bulwer Quarry (29.79953°S:29.78657°E); Lopingian, Lower Beaufort Group, Normandien Formation (Balfour Formation equivalent).

Remark: A characteristically sinuate, long, oblique r–rs crossvein is otherwise known in some species of *Permonka* Riek, 1973 (Rasnitsyn 1977). This similarity might indicate a relationship between the two genera.

ACKNOWLEDGEMENTS

For APR, this study is supported in part by the Programme ‘Biosphere Origin and Evolution of Geo-Biological Systems’ of the Presidium of the Russian Academy of Sciences, and the Russian Foundation for Basic Research grant no. 09-04-01241.

REFERENCES

- CARPENTER, F.M. 1992. Superclass Hexapoda. In: Moore, R.C. *et al.*, eds, *Treatise on Invertebrate Paleontology*. Pt. 4: Arthropoda, Vols 3, 4. Boulder, Col. & Lawrence, Kan.: Geological Society of America & University of Kansas.
- DIJK, D.E., VAN. 1997. Insect faunas of South Africa from the Upper Permian and the Permian/Triassic boundary. *Paleontologica Africana* **34**: 43–48. (erratum with same vol. & pp. published in 1998)
- GASTALDO, R.Á., ADENDORFF, R., BAMFORD, M., LABANDEIRA, C.C., NEVELING, J. & SIMS, H. 2005. Taphonomic trends of macrofloral assemblages across the Permian–Triassic boundary, Karoo Basin, South Africa. *Palaios* **20** (5): 479–497.
- KUKALOVÁ, J. 1965. Permian Protelytroptera, Coleoptera, and Protorthoptera (Insecta) of Moravia. *Sbornik Geologických Ved, Paleontologie* **6**: 61–95, 8 pls.
- MARTYNOV, A.V. 1928. Permian fossil insects of North-East Europe. *Trudy Geologicheskogo muzeya Akademii nauk SSSR [Transactions of the Geological Museum, Academy of Sciences of USSR]* **4**: 38–118, 19 pls.
- RASNITSYN, A.P. 1977. New Paleozoic and Mesozoic insects. *Paleontologicheskii zhurnal* (1): 64–77. (in Russian, translated into English in *Paleontological Journal* (1977) 1978 **11**: 60–72.)
- 1980. *Origin and evolution of Hymenoptera. Transactions of the Paleontological Institute, Academy of Sciences of USSR* **174**: 1–192. (in Russian).
- RASNITSYN, A.P. & ARISTOV, D.S. In press. New fossil insects from the Middle and Upper Permian of European Russia. *Paleontological Journal*.
- RASNITSYN, A.P., ARISTOV, D.S., GOROKHOV, A.V., ROWLAND, J.M., SINITSHEKOVA, N.D. & SUKATSHEVA, I.D. 2004. Important new insect fossils from Carrizo Arroyo and the Permo-Carboniferous faunal boundary. In: Lucas, S.G. & Ziegler, K.E., eds, *Carboniferous–Permian transition. New Mexico Museum of Natural History and Science Bulletin* **25**: 215–246.
- SHAROV, A.G. 1962. Otryad [Ordo] Protoblattodea. In: Rohdendorf, B.B., ed., *Osnovy paleontologii. Chlenistonogie. Trakheynye i khelitserovyye*. Moscow: Academy of Sciences of the USSR, pp. 116–118. (in Russian; English translation: Sharov, A.G. 1991. Order Protoblattodea. In: Rohdendorf, B.B., ed., *Fundamentals of paleontology. Arthropoda, Tracheata, Chelicerata*. Vol. 9. Washington, DC: Smithsonian Institution Libraries and The National Science Foundation, pp. 146–150.)