

A taxonomic note concerning a dicynodont (Synapsida: Anomodontia) from the Middle Triassic of East Africa

A.J. Renaut^{1*}, R.J. Damiani¹, A.M. Yates¹ & P.J. Hancox²

¹Bernard Price Institute for Palaeontological Research, School of Geosciences, University of the Witwatersrand, Private Bag 3, WITS, 2050 South Africa

²School of Geosciences, University of the Witwatersrand, Private Bag 3, WITS, 2050 South Africa

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The complicated histories of the Indian dicynodont *Rechnisaurus* and the East African dicynodont *Kannemeyeria cristarhynchus* has led to the incorrect use of the name '*cristarhynchus*' for the latter taxon. This paper therefore proposes a new species name and diagnosis.

Keywords: Triassic, therapsid, *Kannemeyeria*.

INTRODUCTION

Dicynodonts were a diverse clade of herbivorous, non-mammalian therapsids ('mammal-like reptiles'), which flourished during the Permian and Triassic periods. Dicynodont fossils have been recorded from every continent and an enormous number of genera and species have been named, many of which are ill-diagnosed or based on poorly preserved material (King 1988). Not surprisingly, the taxonomy and phylogenetic inter-relationships of dicynodonts remains contentious (e.g. Angielczyk 2001; Hancox *et al.* 2000).

During the course of a redescription of the well-known African dicynodont *Kannemeyeria simocephalus* (Renaut 2000), the first author encountered an incongruity in the taxonomy of two other dicynodont species, *Rechnisaurus cristarhynchus* and *Kannemeyeria cristarhynchus*, which we outline in this note.

Institutional abbreviations used in the text are as follows: BP, Bernard Price Institute for Palaeontological Research, Johannesburg; ISI, Indian Statistical Institute, Calcutta; R, Geological Survey of Namibia, Windhoek.

TAXONOMY

Roy-Chowdhury (1970) described the partial skull (ISI R37) of a large dicynodont from the Middle Triassic Yerrapalli Formation of India, which he assigned to a new genus and species, *Rechnisaurus cristarhynchus*. Later in the same year, Crozier (1970) published a brief description of two dicynodonts from the 'lower fossiliferous horizon' of the Middle Triassic N'tawere Formation of Zambia, referring one of these specimens, BP/1/3638, to *Rechnisaurus cristarhynchus* Roy-Chowdhury. Keyser (1974) accepted this taxonomic referral with some reservation.

In their seminal review of Triassic dicynodont systematics, Keyser & Cruickshank (1979) re-examined BP/1/3638 from Zambia, as well as R313, a specimen from the Middle Triassic Omingonde Formation of Namibia which had

previously been referred to *Kannemeyeria simocephalus* by Keyser (1973). Keyser & Cruickshank (1979) recognized that BP/1/3638 and R313 were in fact congeneric with *Kannemeyeria*, but a different species from *Kannemeyeria simocephalus*. Consequently, Keyser & Cruickshank (1979), accepting that BP/1/3638 was conspecific with the Indian *Rechnisaurus cristarhynchus* Roy-Chowdhury, argued that *Rechnisaurus* was a junior synonym of *Kannemeyeria*. This recognized the new combination *Kannemeyeria cristarhynchus* (Roy-Chowdhury) for the Indian and Zambian dicynodonts. Note, however, that this synonymy was based entirely on an analysis of the characters present in the African specimens that had been referred to *Rechnisaurus cristarhynchus*, rather than on the holotype described by Roy-Chowdhury (1970).

The synonymy of *Rechnisaurus* with *Kannemeyeria* was implicitly accepted by Cooper (1980), Cox & Li (1983) and Cruickshank (1986). However, Bandyopadhyay (1985) showed that the holotype of *Rechnisaurus cristarhynchus* was clearly morphologically distinct from the African *Kannemeyeria simocephalus*, and that there were no grounds for synonymy. Although much of her argument (Bandyopadhyay 1985, 1989) was based on snout morphology, a feature that Renaut (2000) has shown to be unreliable, she did also draw attention to a number of characters that can be used to distinguish between *Rechnisaurus* and *Kannemeyeria*. Distinguishing characters of *Rechnisaurus* include the large ventrally projecting caniniform process, the flattened palatal surface of the secondary palate, a larger lacrimal than in *Kannemeyeria* that precludes prefrontal maxilla contact, the probable presence of an ectopterygoid and (in referred specimens) the massive forward extension of the zygomatic process of the squamosal. Thus, in her review of the Dicynodontia, King (1988: 110), following Bandyopadhyay (1985), states: 'It is clear then, that the genus *Rechnisaurus* should stand, with its one original species, *R. cristarhynchus*'. Inexplicably, King (1988) retained the name *Kannemeyeria crista-*

*Author for correspondence. E-mail: renauta@geosciences.wits.ac.za

rhynchus Roy-Chowdhury for the Zambian (BP/1/3638) and Namibian (R313) dicynodonts, while maintaining the Indian *Rechnisaurus cristarhynchus* Roy-Chowdhury as a separate taxon.

This taxonomy was subsequently accepted by Bandyopadhyay (1989) and continues to be in use (e.g. Lucas 1998; Renault & Hancox 2001). Clearly, however, the use of the name '*cristarhynchus*' as applied to the Zambian and Namibian specimens of *Kannemeyeria* violates Article 49 of the International Code of Zoological Nomenclature (ICZN 2000), which states the following (relevant names included by us in square brackets): 'A previously established species-group name [*Rechnisaurus cristarhynchus* Roy-Chowdhury] wrongly used to denote a species-group taxon because of misidentification [*Kannemeyeria cristarhynchus* (BP/1/3638, R313)] cannot be used for that taxon [*Kannemeyeria*] even if it and the taxon to which the name correctly applies [*Rechnisaurus*] are in, or are later assigned to, different genera'.

No other names have been applied to the Zambian and Namibian dicynodonts referred to *Kannemeyeria* '*cristarhynchus*'. Accordingly, we propose a new species name here, along with a new diagnosis of BP/1/3638 (Renault 2000), which we designate as the holotype. A full re-description of BP/1/3638 and R313 will be the subject of a forthcoming publication.

Kannemeyeria lophorhinus sp. nov.

Rechnisaurus cristarhynchus (Roy-Chowdhury) Crozier 1970

Kannemeyeria simocephalus (Weithofer) Keyser 1973

Kannemeyeria cristarhynchus (Roy-Chowdhury) Keyser & Cruickshank 1979

Holotype. BP/1/3638, a partial skull and complete mandible (Crozier 1970; Renault 2000).

Type locality and horizon. Locality 16, approximately one kilometre north of Sitwe in the Upper Luangwa Valley, Zambia; 'lower fossiliferous horizon' of the N'tawere Formation, Middle Triassic (Kitching 1963).

Etymology. A combination of *lophos* Greek for 'crested', and *rhinos* Greek for 'snout,' referring to the well-developed median dorsal mid-nasal ridge that extends from the premaxilla onto the frontal.

Diagnosis. Distinguished from *Kannemeyeria simocephalus* by the following characters: skull more robust; total skull width equals total skull length; greater lateral and ventral development of caniniform process; snout deeper and wider; well-developed median dorsal ridge flanked by marked grooves; larger preparietal; zygomatic arches bowed slightly laterally; short, stubby parietal extensions of frontal onto parietal crest; broader intertemporal region; shorter temporal fenestrae; shorter secondary palate; pterygoid complex same length as, or longer than, secondary palate; reduced pterygoid process of maxilla; larger ventral median palatal ridge; wider median,

ventral parabasisphenoid sulcus; lacks pterygoid fossa; squamosal forms planar occiput; wide basioccipital notch, with tubera extending ventrolaterally; large, expanded quadratojugal foramen; lateral dentary shelf of mandible developed into marked ledge; posterior edge of reflected lamina nearly contacts ventral surface of retroarticular process.

Referred specimen. R313, a near-complete skull, from the northern slope of Mount Etjo on the farm Etjo Nord, Otjiwarongo District, Namibia; Omingonde Formation, Middle Triassic (Keyser 1973).

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REFERENCES

- ANGIELCZYK, K.D. 2001. Preliminary phylogenetic analysis and stratigraphic congruence of the dicynodont anomodonts (Synapsida: Therapsida). *Palaeontologia africana* **37**, 53–79.
- BANDYOPADHYAY, S. 1985. *Dicynodont reptiles from the Triassic Yerrapalli Formation and their importance in stratigraphy and palaeontology*. Unpublished PhD thesis, Calcutta University, Calcutta.
- BANDYOPADHYAY, S. 1989. The mammal-like reptile *Rechnisaurus* from the Triassic of India. *Palaeontology* **32**, 305–312.
- COOPER, M.R. 1980. 'The origins and classification of Triassic dicynodonts' by A.W. Keyser and A.R.I. Cruickshank. Discussion. *Transactions of the Geological Society of South Africa* **83**, 107–110.
- COX, C.B. & LI, J.-L. 1983. A new genus of Triassic dicynodont from East Africa and its classification. *Palaeontology* **26**, 389–406.
- CROZIER, E.A. 1970. Preliminary report on two Triassic dicynodonts from Zambia. *Palaeontologia africana* **13**, 39–45.
- CRUICKSHANK, A.R.I. 1986. Biostratigraphy and classification of a new Triassic dicynodont from East Africa. *Modern Geology* **10**, 121–131.
- HANCOX, P.J., RUBIDGE, B.S., MODESTO, S.P. & RENAUT, A.J. 2000. Systematics of the Triassic dicynodonts. *Journal of Vertebrate Paleontology* **20** (Suppl. to 3), 47A.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE. 2000. *International Code of Zoological Nomenclature* (4th edn). London, International Trust for Zoological Nomenclature.
- KEYSER, A.W. 1973. A new Triassic vertebrate fauna from South West Africa. *Palaeontologia africana* **16**, 1–15.
- KEYSER, A.W. 1974. Evolutionary trends in Triassic Dicynodontia. *Palaeontologia africana* **17**, 57–68.
- KEYSER, A.W. & CRUICKSHANK, A.R.I. 1979. The origins and classification of Triassic dicynodonts. *Transactions of the Geological Society of South Africa* **82**, 81–108.
- KING, G.M. 1988. *Anomodontia*. Handbuch der Paläoherpetologie, Teil 17C. Stuttgart, Gustav Fischer Verlag.
- KITCHING, J.W. 1963. The fossil localities and mammal-like reptiles of the Upper Luangwa Valley, Northern Rhodesia. *South African Journal of Science* **59**, 259–264.
- LUCAS, S.G. 1998. Global Triassic tetrapod biostratigraphy and biochronology. *Palaeogeography, Palaeoclimatology, Palaeoecology* **143**, 347–384.
- RENAUT, A.J. 2000. *A re-evaluation of the cranial morphology and taxonomy of the Triassic dicynodont Kannemeyeria*. Unpublished PhD thesis, University of the Witwatersrand, Johannesburg.
- RENAUT, A.J. & HANCOX, P.J. 2001. Cranial description and taxonomic re-evaluation of *Kannemeyeria argentinensis* (Therapsida: Dicynodontia). *Palaeontologia africana* **37**, 81–91.
- ROY-CHOWDHURY, T. 1970. Two new dicynodonts from the Triassic Yerrapalli Formation of central India. *Palaeontology* **13**, 132–144.
- WEITHOFER, A. 1888. Über einen neuen Dicynodonten (*D. simocephalus*) aus der Karrooformation Südafrikas. *Annalen des Naturhistorischen Hofmuseums (Wien)* **3**, 1–6.