

New evidence of *Saurichthys* from the Lower Triassic with an evaluation of early saurichthyid diversity

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Abstract

A new Early Triassic species from the Vega-Phroso Siltstone Member of the Sulphur Mountain Formation of western Canada, *Saurichthys toxolepis* sp. nov., is described, and we confirm the presence of a second species, *Saurichthys dayi*, in the same formation. Another species from the Wordy Creek Formation of East Greenland, *Saurichthys* cf. *S. ornatus*, is introduced. Our review of the Early-Middle Triassic record of the genus *Saurichthys* reveals that species with striking differences in skull anatomy and squamation were already present in the Early Triassic. We briefly review saurichthyid evolution and Early-Middle Triassic paleobiogeography. *Saurichthys* was predominantly marine, and a significant taphonomic bias is identified in the Triassic record. The new evidence highlights the importance of often poorly dated Early Triassic saurichthyids and shows that evolutionary trends are more complex than previously believed.

Introduction

Saurichthyids share a slender and elongate body with far posteriorly positioned pelvic, anal, and dorsal fins and an oblong-slender, pointed snout, usually with long jaws. Saurichthyid remains have caused much confusion due to the lack of diagnostic especially features in isolated teeth, leaving basically the elongate, slender jaws as the universally accepted diagnostic feature of saurichthyids.

Saurichthyids were long known by teeth only. However, STENSIÖ (1919) was the first to realize that *Saurichthys*-like teeth also occur in the actinopterygian *Birgeria* STENSIÖ, 1919. Although isolated teeth of *Saurichthys* AGASSIZ, 1834, and *Birgeria* are extremely similar, it is apparently possible to distinguish teeth of the two genera from individuals larger than a certain body size (TINTORI & GOZZI 2005). Another group of early Mesozoic actinopterygians, *Australosomus* PIVETEAU, 1930 (= *Pristisomus* PRIEM, 1924) and related fishes such as *Arctosomus* BERG, 1941, *Pholidopleurus* BRONN, 1858, and *Macroaethes* WADE, 1932, shares scale features with *Saurichthys* and has a similar distribution in the Early Triassic. This group has been suggested to be closely related to *Saurichthys* on the basis of their deepened flank scales, elongate body shape and externally symmetrical caudal fin. Nevertheless, *Australosomus* and its potential relatives, too, are in need of re-investigation. More recently, acipenseriforms have most often been regarded as the sister group of saurichthyids or as constituting a trichotomy together with *Birgeria* (i.e., GARDINER & SCHAEFFER 1989, COATES 1999, GARDINER et al. 2005).

Following the pioneer work accomplished by AGASSIZ (1834, 1833-43; see MUTTER & CARTANYÀ 2004, 2005) and by STENSIÖ (1919), who erected the genus *Birgeria* to include teeth of “*Saurichthys*” *mougeoti* when describing more complete material from Spitsbergen, about 50 species of *Saurichthys* (some of which based on teeth alone) of Early to Middle Triassic age have been described or mentioned. Important Early to Middle Triassic occurrences of *Saurichthys* are listed in Appendix 1. Many of these remains are unnamed or briefly described under ‘*Saurichthys* sp.’, highlighting the great challenge of a taxonomic revision.

Several formations in western Canada yield fossil fishes Early Triassic in age (GIBSON 1975, PELL & HAMMACK 1992, NEUMAN 1992, DAVIES et al. 1997, NEUMAN & MUTTER 2005) and the specimens from the Sulphur Mountain Formation arguably represent the oldest reasonably complete Early Triassic saurichthyids currently known. Most specimens are flattened and weathered or distorted in the silty and shaly beds, but a minority of fossils, whose exact provenance is unknown, are three-dimensionally

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