FIRST RECORD OF A PACHYCORMID FISH (ACTINOPTERYGII: PACHYCORMIFORMES) FROM THE LOWER CRETACEOUS OF AUSTRALIA

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The Pachycormidae (Pachycormiformes) are an extinct group of Mesozoic marine fishes tentatively identified as stem-teleosts in recent phylogenetic analyses (see Arratia 2004 for summary). The clade is defined by several diagnostic character states: the presence of a compound rostrodermethmoid (forming the anterodorsal roof of the mouth) that contacts the frontals posteriorly and separates the paired premaxillae and nasals, absence of supraorbitals and formation of the dorsal orbital margin by the dermosphenotic, posterior margin of the orbit formed by at least nine rectangular infraorbitals, presence of two, plate-like suborbitals, extrascapulars absent, dermopterotic enlarged and enclosing the supratemporal commissural sensory canal, and large scythe-like pectoral fins with bifurcation of the fin rays only at their tips (see Lambers, 1988; Arratia, 2004).

Pachycormid taxonomy is problematic and a review is necessary but beyond the scope of this paper. Arratia (2004) listed the currently valid taxa, most of which derive from the Jurassic deposits of Europe and North America. In contrast, Cretaceous taxa are poorly known and presently limited to only two genera, Neopachycormus Taverner, 1977, and Protosphyraena Leidy, 1865. Neopachycormus is known from the Cenomanian of Burma (Taverner, 1977); Protosphyraena is temporally and graphically widespread, being recorded primarily from the middle-upper Cenomanian (P. bentonianum Stewart, 1898; Everhart, 2005; Shimada et al., 2006) to lower Campanian (P. tenuis Loomis, 1900, P. gladius [Cope, 1873]; Stewart, 1988; Everhart, 2005) of Russia, Germany, North America, and Japan (Woodward, 1895; Bardack, 1968; Applegate, 1970; Stewart, 1988; Diedrich, 2001; Everhart, 2005). Remains attributable to Protosphyraena are also been identified from the Maastrichtian of Belgium (Leriche, 1929). This paper describes remains attributable to a new genus and species of pachycormid from the Lower Cretaceous (upper Albian) Toolebuc Formation of western Queensland, Australia. This is the first record of a pachycormid taxon from the Early Cretaceous of the Southern Hemisphere.

Institutional Abbreviations—QM, Queensland Museum, Brisbane, Australia; SAM, South Australian Museum, Adelaide, Australia.

SYSTEMATIC PALEONTOLOGY

ACTINOPTERYGII
PACHYCORMIFORMES Berg, 1940
PACHYCORMIDAE Woodward, 1895
AUSTRALOPACHYCORMUS HURLEYI gen. et sp. nov. (Fig. 1A–J)

Holotype and Referred Specimen—QM F52641 (holotype); partial snout (lacking tip of rostrum) and mandible including dentition and associated cranial/postcranial fragments; SAM P40514 (referred specimen), partial skull with rostrum and incomplete pectoral fin.

Locality, Horizon, and Age—Canary Station (type locality), Warra Station (referred specimen locality), near Boulia in central western Queensland, Australia. Both specimens occur within the Toolebuc Formation of the Rolling Downs Group (Eromanga Basin). The Toolebuc Formations is dated as latest mid to late Albian: Pseudoceratium ludbrookiae dinoflagellate zone/upper Coptospora paradoxa–Phimopollenites pannosus spore-pollen zone (Moore et al., 1986; McMinn and Burger, 1986).

Etymology—Australo- (Greek), southern; and -pachycormus (Greek), pachycormid generic name. Refers to the taxon as the first recorded Early Cretaceous pachycormid from the southern hemisphere; hurleyi, named for Tom Hurley (Andamooka, South Australia), discoverer of the holotype. Both the genus and species are masculine gender.

Diagnosis—Among pachycormids Australopachycormus hurleyi is diagnosed by the following combination of character states: rostrodermethmoid lacking marginal teeth but bearing a single pair of obliquely backwards pointing premarginal teeth (autapomorphic for A. hurleyi); rostrodermethmoid produced forward beyond the symphysis of the lower jaw (shared with Orthocormus, Protosphyraena), but further developed into an elongate, tapered rostrum (shared with Protosphyraena); frontoparietal boss absent (shared with Sauropsis, Euthynotus); dentary with procumbent anterior teeth (shared with Orthocormus, Protosphyraena); mandible with a single row of teeth (shared with Pachycormus); inflated anterior coronoid plate (shared with Protosphyraena).

DESCRIPTION

Australopachycormus hurleyi is a large pachycormid, skull length over 450 mm (rostrum length comparable to Protosphyraena ferox at 300 mm; see Woodward, 1895:234). The head (Fig. 1A–G) is elongate and narrow, becoming flattened posteriorly and rectangular in dorsal outline. Neither the type nor referred specimen preserves significant details of the orbit. The posterior skull roof is steeply inclined approximately 20° relative to the longitudinal axis of the snout. The elongate rostrum is straight, and although heavily weathered in the referred specimen SAM P40514 (Fig. 1A–C), was clearly ovoid in cross-section distally becoming increasingly dorsoventrally compressed proximally. The external surface (Fig. 1E) is ornamented by reticulating rugae; these are most prominent longitudinally, becoming finer over the cranial roof. An ornamentation of coarse, reticulating rugae also covers the exposed surfaces of the premaxillae, maxillae, and lower jaw.