ACTINOPTERYGIAN FISHES FROM UPPER CRETACEOUS ROCKS IN ALABAMA, WITH EMPHASIS ON THE TELEOSTEAN GENUS ENCHODUS

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ABSTRACT

Historically, Alabama has benefited from a wealth of vertebrate fossils, especially those from the Upper Cretaceous rock units of the Gulf Coastal Plain. However, fossils from this region have been the subject of disproportionately little scientific interest in recent years. In this study, we reassess the diversity, relative abundance, and stratigraphic distribution of Late Cretaceous actinopterygian fishes from the west-central portion of the state. Surveys of three museum collections in Alabama identified 1,031 curated actinopterygian specimens, including at least 18 genera, three of which (Phacodus, Lepisosteus, and Plethodus) have not been reported previously from the Cretaceous units in the state. The greatest diversity (15 genera) and majority of remains (79.3%) have been recovered from the upper Santonian to middle Campanian Mooreville Chalk. The surveys confirmed that the Mooreville Chalk, as well as the entire Upper Cretaceous sequence in this region, contains the most diverse assemblage of actinopterygians in eastern North America. The most commonly encountered taxon throughout the rock sequence, and the only one found in each unit, is the teleostean genus Enchodus Agassiz. Examination of Enchodus specimens reveals the following biostratigraphic distributions in Alabama: E. petrosus Cope, 1874, dominating Santonian to middle Campanian strata; E. gladiolus, Cope, 1872, being rare in Santonian to Middle Campanian rocks; and E. ferox Leidy, 1855, being rare in upper Santonian and Campanian sediments, and is the only species in the Maastrichtian strata. Basic diversity and abundance data such as this is essential to revitalize paleontological research of many vertebrate groups in the state.

INTRODUCTION

Upper Cretaceous rock units of west-central Alabama have been recognized as producing abundant and high-quality vertebrate fossils at least since the mid-19th century (e.g., Tuomey and Mallet, 1858). Since that time, Alabama has probably produced the greatest diversity, abundance, and most complete specimens of ichthyofauna, sea turtles, mosasaurs, and dinosaurs of any state in the eastern United States (Thurmond and Jones, 1981; G.E. Hooks and J. Lamb, pers. comm., 2006). However, in recent decades, formal vertebrate paleontological study in the state has received comparatively little attention, resulting in an outdated and rudimentary knowledge base for many taxonomic groups, especially fishes. Applegate (1970) compiled the most complete evaluation of fishes from the region to date. It is based almost exclusively on collections at the Field Museum of Natural History and includes reports of three new genera that are still considered to be valid: Palelops, Moorevillia, and Cimolichthys. However, even this study was limited in that it focused primarily on a single geologic unit. The few subsequent publications on fishes from west-central Alabama are either reports of new taxa (e.g., Megalocoelacanthus dobiei, by Schwimmer et al., 1994), unusually well-preserved specimens and/or synonymies (Bell, 1986), reports of taxa previously unknown in the region (Anomaeodus, by Thurmond and Jones, 1981; Phacodus punctatus, by Hooks et al., 1999), or are essentially reiterations of Applegate’s work (Thurmond and Jones, 1981). In the current study, we investigate the diversity, relative abundance, and stratigraphic distribution of actinopterygian fishes from the entire Upper Cretaceous marine sequence in central and western Alabama. In addition, we emphasize the genus Enchodus Agassiz, 1835 (Teleostei: Enchodontidae) because of its overwhelming abundance in museum collections.

Enchodus is an elongate, fusiform, laterally compressed fish (Williston, 1900; Fowler, 1911; Goody, 1969, 1976; Thurmond and Jones, 1981) that was very common from the Late Cretaceous until its probable extinction at the end of the Cretaceous (Goody, 1976; Carroll, 1988; Case and Schwimmer, 1988; Fielitz, 1999, 2004; Shimada and Fielitz, 2006). Although often not as well-preserved as some localities in the Old World (Chalifa, 1989), Enchodus material is