

Fossil “osteoglossomorphs” from East Asia and their implications for teleostean phylogeny

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Abstract

Osteoglossomorphs are primitive teleosts which live in freshwaters of North America and almost all continents of the southern hemisphere. Many fossils, thought to be osteoglossomorphs, are also found in Mesozoic deposits of China. These fossils differ from each other in many morphological characters. Most of them possess a full neural spine on the first preural centrum and only 18 principal rays in the caudal fin. Because these characters were regarded as unique to the Osteoglossomorpha, these fishes were referred to this supercohort without exception. However, these two and most other characters of osteoglossomorphs are found in other non-osteoglossomorph teleosts, and the distribution of these characters implies that they may be primitively shared by early members of a number of teleostean groups.

Three analyses are made. The first two are phylogenetic examinations of the Osteoglossomorpha, based on the synapomorphies used by PATTERSON & ROSEN (1977) to characterize the Osteoglossomorpha, the Elopoccephala, the Clupeocephala, and the Euteleostei. The results suggest that the Osteoglossomorpha is not a monophyletic group according to PATTERSON & ROSEN’s definition. Analysis 3 is investigation of the relationships among Chinese fossil osteoglossomorphs. Thirty-nine characters are coded for 11 fossil osteoglossomorphs (†*Lycoptera*, †*Paralycoptera*, †*Tonxinchthys*, †*Pulinia*, †*Plesiolycoptera*, †*Kuntulunia*, †*Huashia*, †*Changichthys*, †*Tanolepis*, †*Jiaohichthys*, and †*Yanbiania*), and seven representatives (*Elops*, *Hiodon*, *Osteoglossum*, *Notopterus*, *Denticeps*, *Chanos*, and *Coregonus*) of extant teleosts. The results illustrate that some of the so-called osteoglossomorphs in China are not related to the extant osteoglossomorphs. Only four fossil genera belong to the Osteoglossomorpha. Among this group, [†*Kuntulunia* + †*Huashia*] is the sister group to the [*Osteoglossum* + *Notopterus*], †*Yanbiania* and †*Tanolepis* are related to *Hiodon*. †*Pulinia*, on the other hand, is the sister group to *Denticeps*, *Chanos*, and *Coregonus*. †*Plesiolycoptera* and †*Changichthys*, together with the Osteoglossomorpha and [†*Pulinia* + *Denticeps*, *Chanos*, and *Coregonus*], constitute a clade, but their relationships within this clade is unsolved. Other fossil “osteoglossomorphs” locate between this clade and *Elops*. *Elops* is most primitive within analyzed taxa, except †*Pholidophorus bechei*, †*Leptolepis coryphaenoides*, and †*Allothrissops mesogaster*. They are outgroups of present analyses.

Introduction

With extensive collection and research since the 1960s, many freshwater fossil fishes have been reported from Late Mesozoic deposits in China. Few of them were classified with extant teleostean groups until †*Lycoptera*, a famous Late Mesozoic teleost which was distributed widely in North China and Siberia, was referred to the Osteoglossomorpha (GREENWOOD 1970). After that, many Chinese Mesozoic fishes were referred to this supercohort (sensu PATTERSON & ROSEN 1977). The Osteoglossomorpha is a group of primitive teleosts which are now restricted to freshwaters in North America and occur on almost all continents of the southern hemisphere. There are no extant osteoglossomorphs in China. Such a distributional pattern of extant osteoglossomorphs has long been a puzzle (NELSON 1969a, 1973, PATTERSON 1975), for it was difficult to explain how freshwater osteoglossomorphs dispersed between northern and southern continents across the oceans. It was suggested that osteoglossomorphs dispersed from the southern hemisphere to North America through East Asia (NELSON 1969a). The recognition of their fossil

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