

Oldest ionoscopiform fish found from the Middle Triassic of South China

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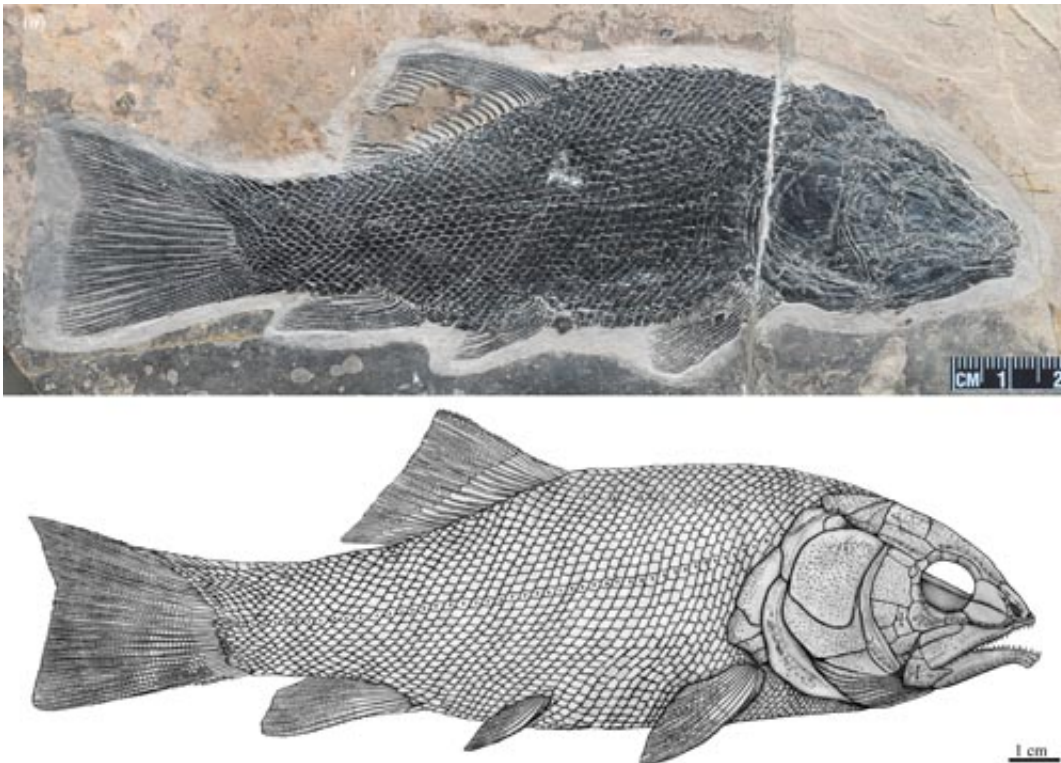


Fig.1 Holotype of *Robustichthys luopingensis* (a), and life reconstruction (b).
Credit: XU Guang-Hui and WU Feixiang

Ionoscopiform fishes have been known only from the Late Jurassic of Europe and the Early Cretaceous of the New World, although potential ionoscopiforms based on poorly preserved specimens, questionably assigned in the genus *Ophiopsis*, have been reported from the Middle

Triassic (Ladinian) of Italy and Austria. According a paper published online May 28 in *Biology Letters*, a new ionoscopiform, *Robustichthys luopingensis*, from the Anisian (242–247 million years ago), Middle Triassic marine deposits of Luoping, eastern Yunnan Province of China, extends the stratigraphic range of this group by approximately 90 million years, and the geographical distribution of this group into the Middle Triassic of South China. These new data also provide a minimum estimate for the split of Ionoscopiformes from its sister clade Amiiformes and shed new light on the origin of ionoscopiform fishes.

The Ionoscopiformes are extinct marine halecomorphs, and the Halecomorphi are a major subdivision of the ray-finned fishes. Although living halecomorphs are represented solely by the freshwater bowfin, *Amia calva*, this clade has a rich fossil history, and the resolution of interrelationships among extinct members is central to the problem of understanding the origin of the Teleostei, the largest clade of extant vertebrates.

This [new species](#), *Robustichthys luopingensis*, was based on eight well-preserved specimens recovered from the Middle Triassic (Anisian) Guanling Formation in Luoping, eastern Yunnan Province of China. Guanling Formation was composed of thinly laminated micritic limestone alternating with silty limestone, indicating a semi-enclosed intraplatform deposit environment. The new species distinguished from other members of the Ionoscopiformes by a combination of features, and represents the first record of this group in Asia.

Researchers conducted a phylogenetic analysis based on a data matrix of 96 characters coded across 28 neopterygian taxa, and its result supports *Robustichthys* as an ionoscopiform, although the interrelationships within this order are not well resolved.

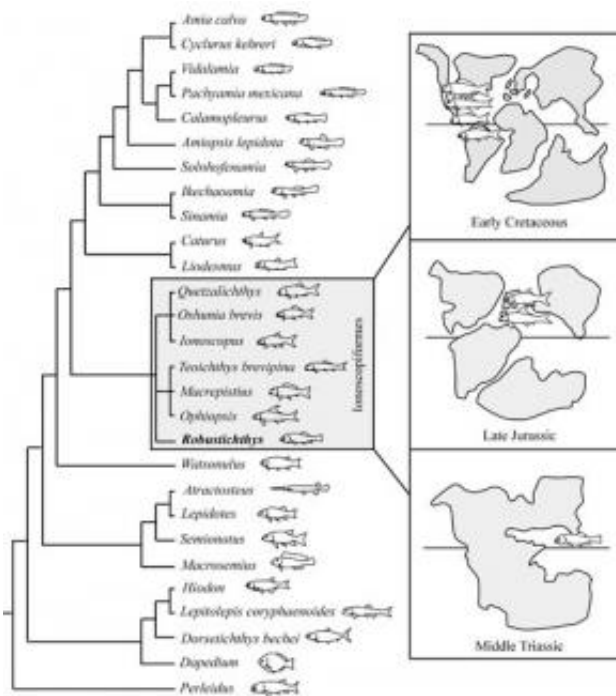


Fig.2. Phylogenetic relationships of *Robustichthys luopingensis* within Neopterygii, and maps illustrating geographical distribution of Ionoscopiformes in three different geological epochs. Credit: XU Guang-Hui

In the Middle Triassic, a vast supercontinent of Pangaea existed, and South China was a part of Palaeotethys Ocean. "The Palaeotethys Ocean would have provided an east–west corridor for dispersal and biological exchanges of ionoscopiforms between Europe and South China, as indicated by studies of other aquatic vertebrates. *Robustichthys* documents the oldest known ionoscopiform, extending the stratigraphic range of this group by approximately 90 million years", said lead author Dr. XU Guang-Hui, Institute of Vertebrate Paleontology and Paleoanthropology (IVPP) of the Chinese Academy of Sciences.

"It provides a minimum estimate for the split of Ionoscopiformes from its sister clade Amiiiformes: no later than the early stage of the Middle Triassic (Anisian, 242–247 million years ago), which is close to the first

record of the Halecomorphi in the late stage of the Early Triassic (Olenekian, 247–251 million years ago). The origin and early evolution of ionoscopiforms should be reconsidered in light of these new data", said study coauthor Dr. Michael Coates, Department of Organismal Biology and Anatomy, University of Chicago.

More information: Guang-Hui Xu, Li-Jun Zhao, and Michael I. Coates. "The oldest ionoscopiform from China sheds new light on the early evolution of halecomorph fishes." *Biol. Lett.* May, 2014 10 5 20140204; [DOI: 10.1098/rsbl.2014.0204](https://doi.org/10.1098/rsbl.2014.0204) 1744-957X

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