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Fish Fossil Reflecting Low, Warm, and Wet Environment During Late Oligocene

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The time at which the Tibetan Plateau rose to its present high elevation are still under debating. For the prominent vertical gradient of the distribution of the Recent organisms living in and around the Plateau, fossils can give some clues to reveal the paleoenvironments. Fish fossils were unearthed from the lacustrine shale in the south part of the Nima Basin, central Tibetan Plateau. The biotitic sandy tephra layers embedded in the fish-bearing strata were dated between 23.5 to 26 Ma using $^{40}\text{Ar}/^{39}\text{Ar}$ methods in early studies. Until now, we have identified anabantid (Perciformes, Anabantidae) and cyprinid (Cyprinidae, Cypriniformes) from those late Oligocene fossil fishes. The fossil anabantid from Nima Basin is the oldest fossil record of the family Anabantidae. Recent anabantids are typical tropical freshwater fishes distributing in South and Southeast Asia, and they restrictedly live in lowland sluggish, standing or even stagnant waters with dense aquatic vegetations. Although the living cyprinids have a wide distribution in the north

hemisphere, the fossil cyprinid from the Nima Basin only resembling the Recent tropical cyprinids living in South and Southeast Asia lowland wetlands with small and shallow waters. A very important characteristic feature of the fossil cyprinid from the Nima Basin is that they bear 33 vertebrae. As observed in living cyprinids in and around the Tibetan Plateau, the genera living in high altitude have more vertebrae than the genera living in low altitude. For example, the Recent cyprinid *Gymnocypris* living in Nima Basin has nearly 50 vertebrae, while the cyprinid *Puntius* living in floodplain of the Ganges has only about 30 vertebrae. The late Oligocene fish fauna from southern Nima Basin reflects a low, warm and wet environment which is similar to Recent lowland wetland in South and Southeast Asia. It might infer that the Tibetan Plateau was still not uplift when late Oligocene.

Key words: late Oligocene, central Tibetan Plateau, fish fossil, Anabantidae, Cyprinidae

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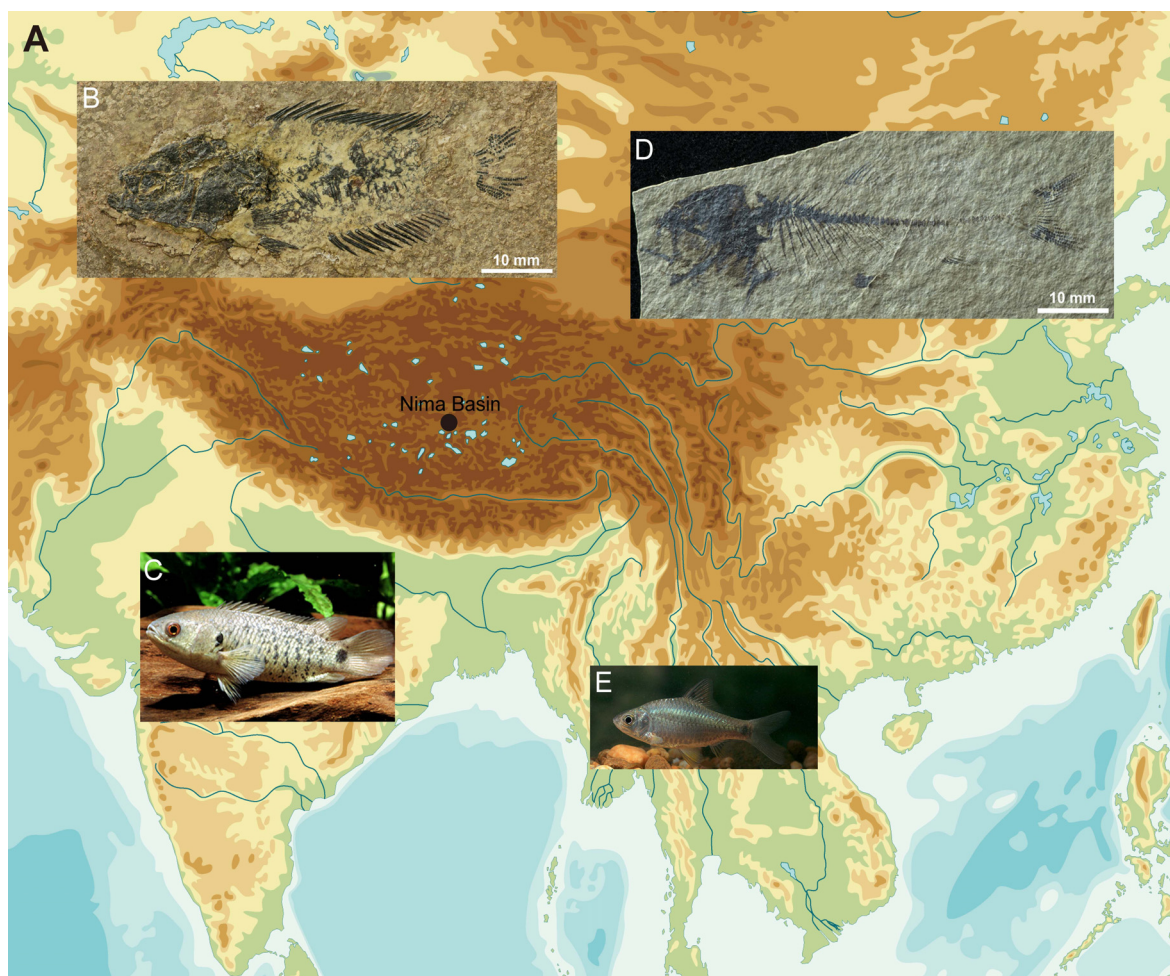


Fig. A. relief map of part of Asia including Tibetan Plateau, South and Southeast Asia, black dot indicates the late Oligocene fish fossil locality in Nima Basin, central Tibetan Plateau; B, fossil anabantid from Nima Basin; C, Recent anabantid *Anabas* sp. living in South and Southeast Asia; D, fossil cyprinid from Nima Basin; E, Recent tropical cyprinid *Puntius* sp. living in South and Southeast Asia.