



## **Into Africa via the Docked India: The climbing perch from the Oligocene Tibet solved its group's palaeobiogeographical puzzle**

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The northward drift of the Indian Plate and its collision with Eurasia have triggered the rising of the Tibetan Plateau and thereby profoundly impacted the evolutionary history of the terrestrial organisms, especially the ones distributed in the Indian Ocean rim. Climbing perches (Anabantidae) are primary freshwater fishes showing a disjunctive south Asian-African distribution, but with an elusive paleobiogeographic history due to the scarcity of fossil records. Based on an updated time-calibrated molecular-based labyrinth fish phylogeny using a number of relevant fossils, especially †Eoanabas, the oldest and most primitive anabantid so far, from the Upper Oligocene of the Tibetan Plateau, we reconstructed for these fishes a series of paleobiogeographical scenarios of much higher resolution than previous studies. We estimated the divergence between the Asian and African climbing perches to have occurred in the Middle Eocene (ca. 40 Ma), a time when the India had already collided with Eurasia. The ancestral range reconstructions suggest a Southeast Asian origin in the Early Eocene (ca. 48 Ma) and subsequent dispersals to Tibet and then India for this group. Thereby we propose an “Into Africa via the Docked India” hypothesis, the ancestral climbing perch might have dispersed in a westbound route to immigrate in Africa via some biotic filter bridge between India and Africa. Such that, the climbing perch precursors had probably followed the paleobiogeographical route of the snakehead fishes, which have an approximate age of the Asian-African lineage split. As a case study, our results reject the classic “Gondwana continental drift vicariance” for the climbing perches’ history, but provides a unique biogeographical model to highlight the role of the un-uplift Tibet and the ‘anchored’ India in shaping the disjunct Asian-African distribution of the freshwater fishes around the Indian Ocean. The utility of the fossil climbing perch †Eoanabas in the analyses is vital and the relevance of the pre-uplift Tibet to the past distribution of some tropical fishes promises more discoveries of unexpected fossils ahead on that underexplored plateau.