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#### Abstract

Phylogenetic and taxonomic studies of the medaka (Belontiiformes, Adrianichthyidae) endemic to Sulawesi, Indonesia

(インドネシア・スラウェシ島固有のメダカ科魚類 (ダツ目) の系統学および分類学的研究)

Family Adrianichthyidae is broadly distributed throughout East and Southeast Asia. Interestingly, 19 species are endemic to Sulawesi, an island in Wallacea. However, it remains unclear how this family biodiversity hotspot was shaped. Moreover, 7 of the 19 endemic species were described within this decade, suggesting that we do not know the full picture of the biodiversity of this family in Sulawesi. First, I reconstructed molecular phylogenies for Sulawesi adrianichthyids and estimated the divergence times of major lineages to infer the history of their origin and subsequent intra-island diversification. The results revealed that species in the basal lineages are currently distributed in the central and southeastern parts of Sulawesi, indicating the common ancestor colonized there from Asia probably by overseas dispersal c.a. 20 Mya. The first diversification event on Sulawesi, the genus *Adrianichthys*, occurred c.a. 16 Mya, resulting in the nesting of *Adrianichthys* within *Oryzias*. Many basal species are riverine and widely distributed in the southeastern and southwestern arms of Sulawesi, suggesting that overseas dispersal between tectonic subdivisions of this island during the late Miocene (7–5 Mya) contributed to the diversification of the basal lineages. In contrast, most derived species are endemic to a single tectonic lake in the central Sulawesi, suggesting that habitat fragmentation due to the Pliocene collisions (< 4 Mya) among tectonic subdivisions of this island was the primary factor for the diversification of derived lineages. Thus, the diversification of Sulawesi adrianichthyids largely reflects the complex geological history of this island. Second, I examined morphological variation and molecular phylogeny among the *Oryzias woworae* species group, to see if they are valid species or not. The results revealed that they cannot be separated both in morphology and phylogeny in a manner that is currently classified. Especially, *O. wolasi* were morphologically rich in variation and phylogenetically polyphyletic, suggesting that *O. wolasi* is not a valid species in both morphological and phylogenetic species concepts. I found that morphometrics of this species group differed according to their habitat environments, suggesting species in this group may be merely ecotypes. Finally, I examined morphology of *Oryzias soerotoi*, a newly described species. *O. soerotoi* is distinguished from all species in genus *Oryzias* in Sulawesi by brilliant orange coloration in the dorsal and ventral margins of the caudal fins of adult males and several other morphometric and meristic characters. Overall, the estimated phylogenies and morphological examinations demonstrated several clade-specific morphological traits, suggesting that they may have played an important role in the intra-island diversification of Sulawesi Adrianichthyidae. Comparisons with other taxa may also help us to understand how the biodiversity hotspot of this “anomalous” island has been shaped.

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