

A New Species of Hagfish *Eptatretus rubicundus* (Myxinidae: Myxiniformes) from Taiwan, with Reference to Its Phylogenetic Position Based on Its Mitochondrial DNA Sequence

Chien-Hsien Kuo¹, Sin-Che Lee², and Hin-Kiu Mok^{3,*}

¹Department of Aquatic Bioscience, National Chiayi University, Chiayi 600, Taiwan

²Institute of Cellular and Organismic Biology, Academia Sinica, Taipei 115, Taiwan

³Institute of Marine Biology, National Sun-Yat-Sen University, Kaohsiung 804, Taiwan

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Chien-Hsien Kuo, Sin-Che Lee, and Hin-Kiu Mok (2010) A new species of hagfish *Eptatretus rubicundus* (Myxinidae: Myxiniformes) from Taiwan, with reference to its phylogenetic position based on its mitochondrial DNA sequence. *Zoological Studies* 49(6): 855-864. A new species of hagfish, *Eptatretus rubicundus* sp. nov., collected from the northeastern coast of Taiwan is described. *Eptatretus rubicundus* sp. nov. was diagnosed by the branchial slime pores and gill apertures arranged in a straight line, the distances from a branchial pore to its immediate preceding and posterior gill apertures were similar; the ventral aorta was not bifurcated; and the combination of the following characters: 5 pairs of gill pouches and gill apertures, gill apertures not crowded, 100-104 total slime pores including those in the branchial region, branchial ducts of approximately the same lengths, the pharyngocutaneous-duct opening fused to the posteriormost left gill aperture, the 1st pair of afferent branchial arteries located between the 1st and 2nd gill pouches, a pair of low, round nasal papillae without supporting cartilage on the roof of the nasal tube, and a pink body. The mitochondrial 16S ribosomal RNA gene fragment sequences confirmed the most basal position of *E. rubicundus* sp. nov. in the Eptatretinae. Gene-sequence data on phylogenetic relationships of the species in the previously recognized genera of *Quadratus*, *Paramyxine*, and *Eptatretus* indicated that these genera are not all monophyletic and suggested that they should be combined into a single genus under the generic name *Eptatretus*. <http://zoolstud.sinica.edu.tw/Journals/49.6/855.pdf>

Key words: *Eptatretus rubicundus* sp. nov., Myxinidae, Phylogeny, Taiwan.

Hagfishes are cartilaginous and jawless marine craniates with an ambiguous phylogenetic relationship to the lampreys and gnathostomes (Stock and Whitt 1992; Forey and Janvier 1993, Nelson 2006). The order Myxiniformes is thought to be monophyletic, based on molecular evidence from mitochondrial 16S ribosomal (r)RNA (Kuo et al. 2003, Chen et al. 2005). This order is divided into 2 subfamilies, the Myxininae and Eptatretinae, based on morphological features (Fernholm 1998). The subfamily Myxininae consists of 4 genera (*Myxine*, *Neomyxine*, *Nemamyxine*, and

Notomyxine). In the Eptatretinae, the number of recognized genera is still controversial (Strahan 1975, Fernholm 1998, Kuo et al. 2003, Chen et al. 2005, Kuraku and Kuratani 2006), with various specialists originally recognizing only *Eptatretus* Cloquet, 1819 (Strahan 1975, Fernholm 1998). *Eptatretus* is primarily characterized by all of the efferent gill-pouch ducts being of approximately the same length and connecting to each aperture on each side of the body, and ducts on the left being confluent with the pharyngocutaneous duct (Adam and Strahan 1963, Nelson 2006). A 2nd

*To whom correspondence and reprint requests should be addressed. Chien-Hsien Kuo and Sin-Che Lee contribute equally to this work. E-mail: hinkiu@faculty.nsysu.edu.tw