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Myxine kuoi, a New Species of Hagfish from Southwestern Taiwanese Waters

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Hin-Kiu Mok (2002) *Myxine kuoi*, a new species of hagfish from southwestern Taiwanese waters. *Zoological Studies* **41**(1): 59-62. Six specimens of a *Myxine* species with 2-cusp multicusps on both sets of cusps and 6 pairs of gill pouches were collected from waters southwest of Taiwan. As there is no previous report of any hagfish from this region with this multicusp pattern, a thorough comparison with other relevant *Myxine* species was made to validate the species status of these specimens. They belong to a species that is herein described as new. http://www.sinica.edu.tw/zool/zoolstud/41.1/59.pdf

Key words: *Myxine kuoi*, Myxinidae, Taiwan, Taxonomy.

Six specimens of a *Myxine* species with 2-cusp multicusps on both set of cusps and 6 pairs of gill pouches were collected from waters southwest of Taiwan. Some *Myxine* species and the majority of *Eptatretus* species (including species in the genus *Paramyxine*; see Fernholm 1998) have 3- and 2-cusp multicusps on the anterior and posterior sets of cusps, respectively. Among the 19 known *Myxine* species, thirteen species have 2-cusp multicusps on both sets of cusps (e.g., Fernholm 1998). The latter character state is less common for hagfishes as a whole. Of these 13 *Myxine* species, one occurs in the western Pacific Ocean, three in the eastern Pacific Ocean, two off the southern tip of South America, two in the Caribbean Sea, four in the Atlantic Ocean, and one in the Mediterranean Sea. The Pacific species include *M. paucidens* (Japan), *M. hubbsi*, *M. hubbsoides*, and *M. pequenoi* (eastern Pacific Ocean).

Only 10 of these 13 species, namely, *M. affinis*, *M. australis*, *M. dorsum*, *M. glutinosa*, *M. hubbsi*, *M. hubbsoides*, *M. knappi*, *M. limosa*, *M. mcmillanae*, and *M. paucidens*, are 6 gilled, as is the new species. Considering geographic distribution, *M. hubbsi*, *M. hubbosides*, and *M. paucidens* from the Pacific Ocean are more important for validating the species status of the present 6 specimens given the typically restricted distribution of members of the genus.

Examination of the tooth patterns of 2 *Myxine affinis* (USNM 39039) revealed that the 378-mm specimen has a 2-/2-cusp multicusp condition, whereas the 548-mm specimen has a 3-/2-cusp multicusp pattern instead. Since the 288 specimens of *M. affinis* examined by Wisner and McMillan (1995) had the 2-/2- cusp multicusps character state, it is treated as the typical condition of the species. Aware of the possibility of intraspecific variation in this character, the new species was also compared with other Pacific Ocean species, including *M. garmani* (Japan), *M. fernholmi* (Chile and the Falklands), and *M. debueni* (Strait of Magellan), which have both the 3-/2-cusp multicusp and 6-gilled character states.

Methods of counting and measuring follow those of Wisner and McMillan (1995). All measurements are in millimeters, and body proportions are in percent of total length. Data are presented as the holotype value followed by values of paratypes or range of type specimens in parentheses. Institutional abbreviation: NSYSU, National Sun Yat-sen Univ.; USNM, National Museum of Natural History, USA.

***Myxine kuoi* sp. nov.**
(Fig. 1)

Holotype: NSYSU 3176, 187 mm, sex undetermined, waters southwest of Taiwan, 22˚29'35"N, 120˚03'34"E, at 595 m, 25 Nov. 1997, *R/V Ocean Researcher III*, Cruise 380, sta.1.

Paratypes: NSYSU 3177, 4 specimens, 123-187 mm, sex undetermined, collected with holotype. NSYSU 3178, 1 specimen, 410 mm, female rich with eggs reaching 12 mm, 15 Feb. 1997, at Tong Kang fish market on the southwestern coast of Taiwan (22˚28'N, 120˚27'E), captured offshore.

Diagnosis: The combination of 2-cusp multicusps on the anterior and posterior sets of cusps, a single medial small papilla (or the nasal-sinus papilla) on the inner dorsal surface of the nasal sinus near the apex (Fig. 2), and 6 pairs of gill pouches is sufficient to distinguish the new species from other Pacific Ocean *Myxine* species.

Description: Body slender; prebranchial length 27.3% (25.9%-28.7%) of TL, trunk length 57.8% (56.9%-63.2%) of TL, tail length 15.0% (11.0%-16.2%) of TL, body depth: branchial region 4.3% (3.9%-4.6%), excluding finfold 5.3% (4.4%-5.3%), including finfold 6.3% (4.4%-6.3%), over cloaca 4.7% (4.1%-4.7%), tail region 5.6% (3.1%-6.6%) of TL; ventral finfold well developed in young, vestigial in mature specimens; caudal finfold not obvious; slime pore counts: prebranchial 24 (27, 28, 29, 30, 26), trunk 64 (57, 68, 62, 59, 61), tail 12 (13, 12, 11, 11, 11), 1 (0-1) slime pore above cloaca, total slime pores: 100 (95-100); teeth: a 2-cusp multicusp on both the anterior and posterior sets of cusps, numbers of unicusps in anterior/posterior cusp sets: 5 (5-6)/7 (6-7), total number of cusps on both sides: 32 (30-32). Body brownish, mid dorsal, upper 1/3 of body side and abdomen behind gill apertures light brown, lower 2/3 of body side dark brown, base of ventral finfold light brown, margin pale in alcohol.

Comparison: Mok (2001) reported a medial papilla or a pair of symmetric small papillae on the inner dorsal surface of the nasal sinus close to the apex in all *Myxine* species, *Neomyxine*, and some species of *Eptatretus* and *Paramyxine*. The size and morphology of these structures exhibit some interspecific variations. The new species, *M. hubbsi*, *M. hubbsoides*, and *M. debueni* all have a single medial nasal-sinus papilla, whereas *M. garmani* and *M. fernholmi* have paired nasal-sinus papillae. As no specimens of *M. paucidens* are available for examination, its nasal-sinus papilla condition is unknown.

The new species has a longer tail than do *M. hubbsi* and *M. hubbsoides* (14% vs 11% and 12%; Wisner and McMillan 1995). *M. hubbsoides* can be readily distinguished from the new species and *M. hubbsi* by total slime pore count (*M. hubbsoides* (111-114); the new species (97-101); *M. hubbsi* mode 94-101, range 90-111; Wisner and McMillan 1995). *Myxine debueni* can be segregated from the new species, *M. hubbsi*, and *M. hubbsoides* by the number of slime pores on the tail; *M. debueni* has fewer slime pores (7) than the new species (11-13), *M. hubbsi* (8-14, mode 10-12),

Fig. 1. Dorsal (left photo) and ventral (right photo) views of the *Myxine koui* holotype.

and *M. hubbsoides* (12-13) (Wisner and McMillan (1995). In sum, *Myxine kuoi exhibits* distinct differences from other relevant *Myxine* species despite being rather similar externally to *M. hubbsi* which occurs in the eastern Pacific Ocean off the west coasts of North and South America.

For myxinines, 83% of species with 2-cusp multicusps on both sets of cusps have a single nasal-sinus papilla, whereas 67% of species with a 3-cusp multicusp and a 2-cusp multicusp on the anterior and posterior sets of cusps, respectively, have a pair of symmetric nasal-sinus papillae (Mok 2001). As *Myxine kuoi* has the 1st set of characters (2-/2-cusp multicusps and single nasal-sinus papilla), it is, therefore, very likely that the multicusp condition seen in these type specimens of *M. kuoi* is characteristic of this species.

Distribution: Known from the southwestern coast of Taiwan.

Etymology: The species name refers to Mr. Chien-Hsien Kuo for his contributions to hagfish taxonomy.

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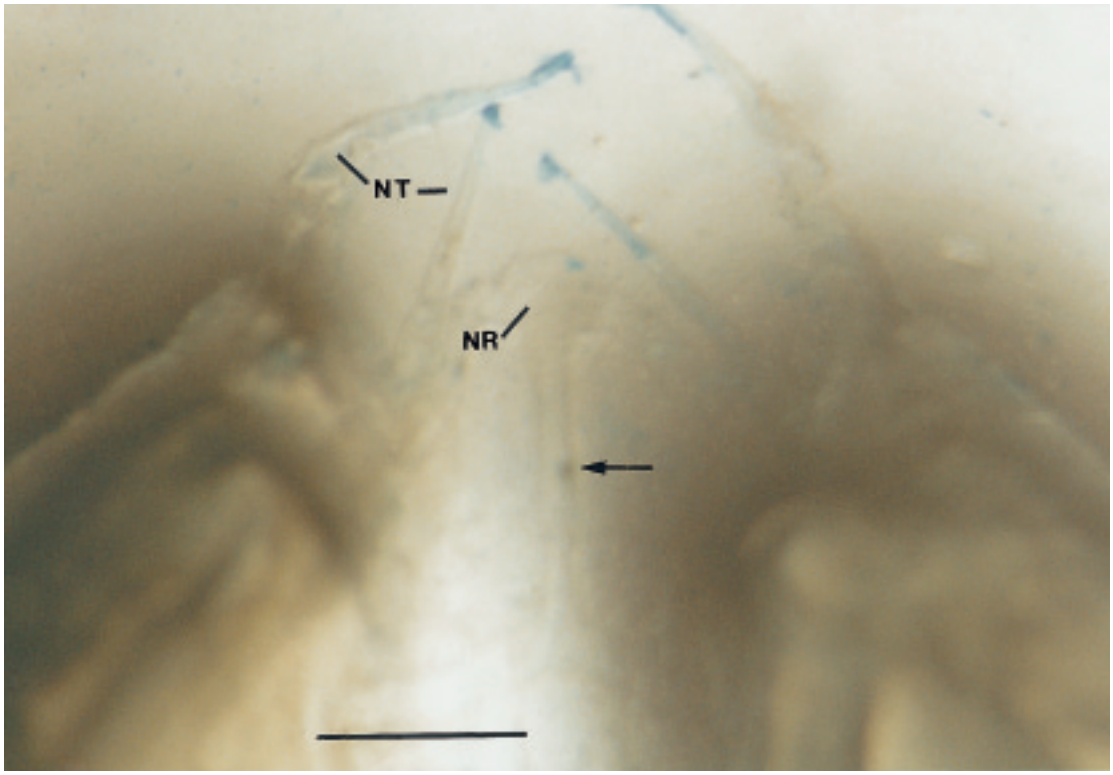

Fig. 2. Apex of the dorsal portion of the nasal sinus of *Myxine koui* showing the minute medial nasal-sinus papilla ventral to the 1st nasal ring (NR). Ventral view. Scale: 1 mm. The nasal sinus is from a cleared-and-stained cranium of a non-type specimen (395 mm). The arrow points to the nasal-sinus papilla. NT: nasal tentacle.

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臺灣西南海域之新種郭氏盲鰻

莫顯蕎

本新種分布在臺灣西南海域，六尾模式標本之前後顎合齒均含二枚牙齒。此癒合齒式的盲鰻屬魚種過去未曾於臺灣海域出現，經與該屬其他種類比較後，確定此為新種並命名為郭氏盲鰻。

關鍵詞：郭氏盲鰻，盲鰻科，臺灣，分類。

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