

Specimen catalog of pieces collection of National Museum of Marine Biology and Aquarium transferred from Tunghai University. (II) Order Anguilliformes

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Abstract

The aim of the serial study was to revise the species validity in accordance with the current taxonomic progresses and subsequently recatalogue the Anguilliformes collection transferred from the Pieces collection of Tunghai University (THUP) into that of National Museum of Marine Biology and Aquarium (NMMPB). A total of 240 lots with 618 specimens were reidentified as 59 species and 35 genera in 9 families. Type series of the four species described by Chen and Weng (1967) were confirmed and the lectotype for each species was designated, namely *Rhynchoconger brevirostris* (= *Macrocephenchelys brevirostris*), *Myrophis cheni* (“*Neeenchelys*” *cheni*), *Chlopsis taiwanensis* (= *Gavialiceps taiwanensis*), and *Dysomma melanurum*. In addition, three newly recorded species, *Echelus uropterus*, *Neeenchelys parvipectoralis*, and *Phyllophichthus xenodontus*, in Taiwan were recognized and described. A catalog denoted of the original THUP and the new registered NMMPB codes was provided.

Key words: Taxonomy, Anguilliformes, lectotype, *Echelus uropterus*, *Neeenchelys parvipectoralis*, *Phyllophichthus xenodontus*

Introduction

One of the most important missions of the museum archiving is to provide a long-term, well-arranged preservation of the voucher specimens for a variety of studies such as taxonomy, systematics, biogeography, molecular phylogeny, and many others that are directly and indirectly attributed to the morphological variations among numerous individuals. As part of a relocation of the entire Pieces collection of Tunghai University (THUP), an important voucher collection that could be tracked back since 1956, into that of National Museum of Marine Biology and Aquarium (NMMBP) in 2004, the transferred specimens were required to be recatalogued to meet the proper curatorial management. More importantly, it is necessary to revise the status of species validity in accordance to the updated taxonomic progresses. Ho et al. (2009) reidentified and recatalogued 9 families and 69 species for the Pleuronectiformes transferred from THUP to NMMBP.

Anguilliformes, commonly known as the eels, is one of the four orders of the superorder Elopomorpha that is characterized by the distinctive leptocephali larva. Eels are elongated in body shape and usually have narrow gill openings. Pelvic fins are absent and dorsal and anal fins are confluent with caudal fin. Scales are usually absent or of embedded cycloid form if present. The taxonomic study of Anguilliformes within Taiwan was initiated by Günther (1870) who firstly recorded 5

eel species. In two comprehensive works of Taiwanese fishes, 25 eels species, including 5 new ones, were recorded among the total 286 fish species from Taiwan (Jordan and Evermann, 1902; Jordan and Richardson, 1909).

Chen and Weng (1967) founded the apodal fishes of Taiwan and a primary record of 65 eel species belonging to 31 genera in 10 families was achieved. The description of four new species, *Rhynchoconger brevirostris*, *Myrophis cheni*, *Chlopsis taiwanensis*, and *Dysomma melanurum*, was included. However, these species were rarely mentioned afterwards and the status of the first two was still unclear. Chen and Yu (1986) further extended the species number to 37 genera and 77 species from Taiwanese waters and the authors were not convinced that all vouchers were not completely designated correctly and the status of all species was questionable. Shen et al. (1993) recorded 86 species in 9 families from Taiwan. The Taiwan Fish Database currently recorded 13 families with 157 species from Taiwan (Shao, 2010), about one fifth of the total eel species in the world.

Most anguilliform specimens described in Chen and Weng (1967) and Chen and Yu (1986) were believed to be transferred from THUP to NMMBP. Serial work has been conducted continuously since Ho et al. (2009), thus the purpose of this study is to revise the Anguilliformes catalog for Taiwan.

Materials and Methods

Methods and terminology followed Böhlke (1989). Museum abbreviations could be found in "a guide to fish collections in the catalog of fishes database" (Fricke and Eschmeyer, 2010). Total length (TL) was used throughout.

Results and Discussion

Excluding the uncertain specious status of some moray eels (*Gymnothorax* in

Muraenidae) and conger eels (*Ariosoma*, *Bathycongrus*, *Gnathophis* and *Parabathymyrus* in Congridae) that will be reported in a separate study, a total of 240 lots with 618 THUP eel specimens were reidentified as 59 species across 9 families. A catalog denoted of the original THUP and the newly registered NMMBP codes, as well as the number of specimens, was provided (Tab. 1).

Table 1. Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

	Family and species	THUP	NMMBP	n
鰻鱺科	Anguillidae			
日本鰻	<i>Anguilla japonica</i>	1569	3044	1
		38, 1569, 1812, 1951, 2144, 2574	3156	15
		-	3710	1
		38	4192	1
		2574	4193	1
		1951	4194	1
		2144	4195	1
		1812	4196	1
		3487	4703	4
鱸鰻	<i>Anguilla marmorata</i>	-	3045	2
		377	4457	1
		1952	5372	1
蜆鰻科	Moringuidae			
短線蜆鰻	<i>Moringua abbreviata</i>	3257-3259, 3456	5487	7
大頭蜆鰻	<i>Moringua macrocephalus</i>	3130-3131	5274	2
鯧科	Muraenidae			
星帶蝮鯧	<i>Echidna nebulosa</i>	3455	2913	1
		3286-3287	3118	2
		3251-3252	3119	2
		3085	3175	1

Table 1. (continued) Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

Family and species		THUP	NMMBP	n
		-	3469	3
		-	3470	2
		-	3769	2
多環蝮鯧	<i>Echidna polyzona</i>	3254, 3256, 3294, 3326, 3451, 3582	3172	13
		3254, 3256	4670	2
		3294	4671	1
		3451	4672	1
		3082	4673	1
		3720	5479	5
豹紋勾吻鯧	<i>Enchelycore pardalis</i>	-	2421	1
斑馬裸胸鯧	<i>Gymnomuraena zebra</i>	3083	4208	1
班第氏裸胸鯧	<i>Gymnothorax berndti</i>	1325	4277	1
伯恩斯裸胸鯧	<i>Gymnothorax buroensis</i>	-	2483	1
雲紋裸胸鯧	<i>Gymnothorax chilospilus</i>	3289, 3896	3277	13
		3289	4827	1
		3288	5591	1
黴身裸胸鯧	<i>Gymnothorax eurostus</i>	3293	4702	7
大斑裸胸鯧	<i>Gymnothorax favagineus</i>	1920	4278	1
花鰭裸胸鯧	<i>Gymnothorax fimbriatus</i>	3325, 3327	1439	2
		3452	1440	2
		3260	1445	1
		3888	1467	1
		3084	1468	1
		3922	2931	1
		3084, 3227, 3260, 3325, 3452-3453, 3888	3176	9
		-	3645	1
黃邊鰭裸胸鯧	<i>Gymnothorax flavimarginatus</i>	-	3023	4
		-	3037	1
		3247-3248, 3250, 3291-3292	4190	11
		3330	4191	1
		3449	4406	3

Table 1. (continued) Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

Family and species		THUP	NMMBP	n
		3883	4459	8
鋸齒裸胸鯔	<i>Gymnothorax prionodon</i>	1654-1655	4276	3
斑頸裸胸鯔	<i>Gymnothorax margaritophorus</i>	-	3418	1
小裸胸鯔	<i>Gymnothorax minor</i>	702, 1960, 2015-2017, 2189-2190	2420	11
		-	3353	3
		2015-2017	4773	3
		2189-2190	4774	2
		702	4775	1
		-	6231	1
		3073	6354	1
花斑裸胸鯔	<i>Gymnothorax neglectus</i>	2950	4279	1
細點裸胸鯔	<i>Gymnothorax pictus</i>	3290, 3324	3260	1
		3290	4577	
		3324	4578	1
長身裸胸鯔	<i>Gymnothorax prolatus</i>	-	3021	1
淡網紋裸胸鯔	<i>Gymnothorax pseudothyrsoides</i>	-	3222	1
		169	4551	1
裸胸鯔屬	<i>Gymnothorax</i> sp.	3425	2974	1
		4093	3257	2
		356, 2975, 3232, 3244	3386	4
		-	3839	2
密點裸胸鯔	<i>Gymnothorax thyrsoides</i>	-	3711	2
		2950	3840	1
黑身管鼻鯔	<i>Rhinomuraena quaesita</i>	-	5174	1
巨鰭尾鯔	<i>Uropterygius macrocephalus</i>	-	3841	1
		-	3879	
黃鰭尾鱧	<i>Uropterygius xanthopterus</i>	-	2560	1
通鰓鰻科	Synphobranchidae			
前肛鰻	<i>Dysomma anguillare</i>	4180	2520	1
		676-677, 2097, 2157, 2753, 3152, 3243	3301	6
		-	3351	16

Table 1. (continued) Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

Family and species		THUP	NMMBP	n
		-	4517	1
		2097	5708	1
		3152	5709	1
		3243	5710	1
		2157	5714	1
		2753	5715	1
		676-677	5716	2
黑尾前肛鰻	<i>Dysomma melanurum</i>	1687 (P)	3885	1
		1687 (L)	5284	1
		1687 (P)	5470	1
蛇鰻科	Ophichthidae			
盲蛇鰻	<i>Bascanichthys kirkii</i>	2165	4413	1
中國鬚蛇鰻	<i>Cirrhimuraena chinensis</i>	2785	5584	1
蠕鰻	<i>Echelus uropterus</i>	-	2479	3
		4176	5283	2
半環平蓋蛇鰻	<i>Leiuranus semicinctus</i>	3249	5310	2
大鰭蟲鰻	<i>Muraenichthys macropterus</i>	4076	2915	1
		-	3005	1
		-	3011	1
竹節花蛇鰻	<i>Myrichthys colubrinus</i>	3285	5082	1
		3450	5084	1
		3246	5803	1
巨斑花蛇鰻	<i>Myrichthys maculosus</i>	-	2558	2
陳氏"新鰻"	<i>"Neenchelys" cheni</i>	3328 (P)	1534	1
		4037	1535	1
		3234 (L)	3019	1
微鰭新鰻	<i>Neenchelys parvipectoralis</i>	-	2912	6
頂蛇鰻	<i>Ophichthus apicalis</i>	4169	1407	1
		776	1408	1
		364	1409	1
		364	2395	1
艾氏蛇鰻	<i>Ophichthus lithinus</i>	-	3193	1
		695	6394	1
		3100-3101	6395	2
		3322	6396	1

Table 1. (continued) Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

Family and species		THUP	NMMBP	n
大鱗蛇鰻	<i>Ophichthus macrochir</i>	1689	3234	1
		1689	4490	1
		2914	4491	1
		4173	4492	1
		2934	5312	1
巨目蛇鰻	<i>Ophichthus megalops</i>	2983	5588	2
裾鱗蛇鰻	<i>Ophichthus urolophus</i>	-	1352	1
		1701-1702	1423	2
		3095	1450	1
		2947	1451	1
		3231	1452	1
		-	2468	1
		2781-2782	5722	2
葉鼻鰻	<i>Ophichthus cf. urolophus</i>	4174	6658	1
		3321	6662	1
		-	2753	1
波路荳齒蛇鰻	<i>Pisodonophis boro</i>	3881	5264	2
		777	1443	1
食蟹荳齒蛇鰻	<i>Pisodonophis cancrivorus</i>	2736	1444	1
		2736	3884	1
		-	3013	1
海鰻科	Muraenesocidae	160, 1699	3238	3
		-	3318	3
		2736	3321	2
		4172	4967	2
		160	5721	1
		1699	5723	1
		3159	5724	1
		649	5725	1
台灣絲尾海鰻	<i>Gavialiceps taiwanensis</i>	2784 (P)	1360	26
		2671 (L)	1405	1
		2784 (P)	1410	1
		-	3003	1
		-	3004	1

Table 1. (continued) Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

Family and species		THUP	NMMBP	n
		-	3210	3
		-	3211	10
海鰻	<i>Muraenesox cinereus</i>	1741	6651	1
		3154	6675	1
		1595	6676	1
		615	6681	1
狹頷海鰻	<i>Oxyconger leptognathus</i>	1034	1462	1
		-	3006	1
		159	4586	1
		2915	4587	1
		2949	4588	1
		3962	4589	1
		4175	5208	2
線鰻科	Nemichthyidae			
線鰻	<i>Nemichthys scolopaceus</i>	2641	3022	1
		2770	5123	1
		3963	5124	1
糯鰻科	Congridae			
大錐體康吉鰻	<i>Ariosoma major</i>	3961	1404	1
		3149	1406	1
美體鰻屬	<i>Ariosoma</i> sp.	4179	1400	1
		-	2459	1
		3329	2517	1
		-	2936	3
		-	3010	1
		3295	3174	1
		3149, 3961, 4179	3209	10
		-	3290	1
		3104	3387	1
		164-165, 687, 767-768, 3156, 3242, 3965, 4178	3405	21
		3080	3406	1
		171	4134	1
		171, 1696-1697	4140	2

Table 1. (continued) Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

Family and species		THUP	NMMBP	n
		172	4541	1
深海康吉鰻屬	<i>Bathycongrus</i> sp.	-	1362	2
		1688	1469	1
		3094	1470	1
		3079	1471	1
		3147	1472	1
		3096	1473	1
		-	3018	1
		-	3332	1
		4177?	3388	6
		-	3389	16
		-	3797	1
		3964?	4041	1
深海糯鰻	<i>Bathymyrus simus</i>	1009	1399	1
灰糯鰻	<i>Conger cinereus</i>	-	1358	2
		3331	1396	1
		3454	1397	1
		3195	1476	1
		3253, 3255	1477	2
		-	3012	1
		3897	4458	8
日本糯鰻	<i>Conger japonicus</i>	-	3365	1
		-	4531	1
		166	4983	1
繁星糯鰻	<i>Conger myriaster</i>	-	6392	1
大口康吉鰻	<i>Congriscus megastomus</i>	4078	3001	1
頷吻鰻屬屬	<i>Gnathophis</i> sp.	3455?	1792	1
		167-168	5204	3
短突糯鰻	<i>Macrocephenchelys brevirostris</i>	-	2415	56
		4077	2937	1
		3236, 3241	4181	1
		3236, 3241 (P)	4181	2
		3078 (L)	5177	1
擬海糯鰻屬	<i>Parabathymyrus</i> sp.	2790	1403	1
		3081, 3093	1412	2

Table 1. (continued) Anguilliform specimen catalog donated from the original Tunghai University (THUP) along with the new registered National Museum of Marine Biology and Aquarium (NMMBP) codes. L: lectotype; P: paralectotype; n: number of fish.

Family and species		THUP	NMMBP	n
		-	2458	1
突吻鰻	<i>Rhynchoconger ectenurus</i>	-	3020	1
		-	3319	9
		4177?	3416	1
		-	3421	5
		3160, 3150-3151, 3155	4657	4
		610, 648	4658	2
狹尾糯鰻	<i>Uroconger lepturus</i>	-	3007	1
		-	3046	4
		-	3355	9
		645, 674, 690, 2744, 2948, 3103, 3105, 3148, 3153, 3157-3158	3357	10
		4177?	3417	2
		4177	4044	1
		2744	4635	1
		3148, 3153, 3157-3158	4636	4
		645, 674, 690	4637	3
		2948	4638	1
		3103, 3105-3106	4639	3
鴨嘴鰻科	Nettastomatidae			
前鼻鴨嘴鰻	<i>Nettastoma solitarium</i>	-	3482	1
		4038	5705	1
線尾蜥鰻	<i>Saurenhelys fierasfer</i>	1011	1463	1
		3107-3110	1464	4
		2779, 4038	2515	7
		-	2529	1
		1011, 1413, 3107-3110	3204	5
		1413	3842	1
		2779	5704	1
Total				618



Fig. 1. *Macrocephenchelys brevirostris* (Chen and Weng, 1967), NMMBP 5177 (formerly THUP 3078), lectotype of *Rhynchoconger brevirostris* Chen and Weng, 1967, 320 mm TL.

1. New species described by Chen and Weng (1967)

Type series of the four new species, *Rhynchoconger brevirostris* (= *Macrocephenchelys brevirostris*), *Myrophis cheni* (= “*Neeenchelys*” *cheni*), *Chlopsis taiwanensis* (= *Gavialiceps taiwanensis*), and *Dysomma melanurum*, described by Chen and Weng (1967), were reexamined below.

Family Congridae

***Rhynchoconger brevirostris* Chen and Weng, 1967**

= ***Macrocephenchelys brevirostris* (Chen and Weng, 1967)**

大頭短吻鰻

Fig. 1

Rhynchoconger brevirostris Chen and Weng, 1967: 54. (Type locality: Tungkang, Taiwan).

Macrocephenchelys brevirostris (Chen and Weng, 1967): Smith in Randall and Lim, 2000: 586.

Lectotype. NMMBP 5177 (formerly THUP 3078), 320 mm TL, Tungkang, Aug. 1956.

Paralectotype. NMMBP 4181 (formerly THUP 3236 and 3241), 2 specimens, 282-293 mm TL, Tungkang, May 1966.

Remark. Chen and Weng (1967) mentioned that the description and the figure were based on a 320-mm specimen, which is selected as the lectotype herein. Chen (2002) listed this species as the junior synonymy of *M. soela*. However, *M. soela*

was described subsequent to *M. brevirostris* and should not be considered as a senior synonymy. A review work of the Congridae in Taiwan is being studied by D.G. Smith et al.

Family Ophichthidae

***Myrophis cheni* Chen and Weng, 1967**

= "*Neenchelys*" *cheni* (Chen and Weng, 1967)

陳氏“新鰻”

Fig. 2



Fig. 2. "*Neenchelys*" *cheni* (Chen and Weng, 1967), NMMBP 3019 (formerly THUP 3234), lectotype of *Myrophis cheni* Chen and Weng, 1967, 350 mm TL.

Myrophis cheni Chen and Weng, 1967: 39. (Type locality: Tungkang, Taiwan). McCosker in Randall and Lim, 2000: 586. Chen, 2008: 13.

?*Neenchelys retropinna* Smith and Böhlke, 1983: 80 (Type locality: Gulf of Oman, 26°10'N, 57°02'E, depth 55-64 m). McCosker and Chen, 2000: 356.

Lectotype. NMMBP 3019 (formerly THUP 3234), 350 mm TL, Tungkang, May 1966.

Paralectotype. NMMBP 1534 (formerly THUP 3328), 335 mm TL, Tungkang, Sep. 1966.

Description. Morphometric and meristic data of the two type series were provided based on our examination: head length (HL) 8.4-9.1%, predorsal length 36.3-40%, trunk length 25.1-27.7%, preanus length 27.4-34.3%, tail length 62.6-65.7% in TL. Gill-opening height 4.7-5.4%, pectoral fin length 10.9-13.5%, snout length 20.1-20.4%, eye diameter 5.8-6.0%, interorbital width 11.6-13.2%, body depth 24.1% in HL. Total vertebrae 181, MVF=59-57-180. Number of lateral line pores: 10 anterior to pectoral fin base, 59-60 anterior to dorsal fin origin, and 56-57 anterior to anus.

Remark. Most of the description and the figure in Chen and Weng (1967) was based on a 350-mm specimen, which was selected as the lectotype herein. Examination of the type series of *M. cheni* reveals that they might be a member of *Neenchelys*, which is characterized by the presence of

caudal fin, an eye diameter of 2 times wider than snout length, and the posterior nostril with a short cleft that situates at the anterior lower corner of the eye. McCosker and Chen (2000) had recorded *Neenchelys retropinna* from Taiwan, which was represented by a single specimen and was also identical to the type series of *M. cheni* based on our examination. Thus, *N. retropinna* and “*N.*” *cheni* are very likely conspecific. However, this hypothesis has yet to be supported by examining additional materials from a broader area.

Family Muraenesocidae

***Chlopsis taiwanensis* Chen and Weng, 1967**

= ***Gavialiceps taiwanensis* (Chen and Weng, 1967)**

台灣絲尾海鰻

Fig. 3

Chlopsis taiwanensis Chen and Weng, 1967: 81. (Type locality: Tungkang, Taiwan). *Gavialiceps taiwanensis* (Chen and Weng, 1967): Karmovskaya, 1994: 84. Smith in Randall and Lim, 2000: 586.

Lectotype. NMMBP 1405 (formerly THUP 2671), 1 specimen, 564 mm TL, Tungkang, Taiwan, Jan. 1965.

Paralectotype. NMMBP 1360 and NMMBP 1410 (formerly THUP 2784), 27 specimens, 310-610 mm TL, Tungkang, Taiwan, Mar. 1965.

Remark. There were two lots with 31



Fig. 3. *Gavaliceps taiwanensis* (Chen and Weng, 1967), NMMBP 1405 (formerly THUP 2671), lectotype of *Chlopsis taiwanensis* Chen and Weng, 1967, 564 mm TL.

specimens (6 in THUP 2671 and 25 in THUP 2784) used for the original description. Twenty-eight specimens were relocated (1 in NMMBP 1405, 26 in NMMBP 1360, and 1 in NMMBP 1410). Most of the description and the figure in Chen and Weng (1967) was based on a 564-mm specimen that is selected as the lectotype herein.

Family Synphobranchidae

***Dysomma melanurum* Chen and Weng, 1967**

黑尾前肛鰻

Fig. 4

Dysomma melanurum Chen and Weng, 1967: 84. (Type locality: Tung kang, Taiwan).

Smith in Randall and Lim, 2000: 585. Chen and Mok, 2001: 79.

Lectotype. NMMBP 5284 (formerly THUP 1687), 1 specimen, 275 mm TL, Tung kang, Taiwan, Feb. 1961.

Paralectotype. NMMBP 3885 and NMMBP 5470 (formerly THUP 1687), 2 specimens, 213-215 mm TL, same as the lectotype.

Remark. Robins and Robins (1976), who examined the type series, gave a detailed description of the holotype. The description and the figure in Chen and Weng (1967) were based on a 275-mm specimen that was selected as the lectotype herein.



Fig. 4. Lectotype of *Dysomma melanurum* Chen and Weng, 1967, NMMBP 5284 (formerly THUP 1687), 275 mm TL.

2. New record species

Three newly recorded species from Taiwan were identified, namely *Echelus uropterus*, *Neenchelys parvipectoralis*, and *Phyllophichthus xenodontus*. A brief description for each species was provided.

Family Congridae

Echelus uropterus (Temminck and Schlegel, 1846)

蠕鰻

Fig. 5

Conger uropterus Temminck and Schlegel, 1846: 261 (Type locality: Nagasaki, Japan).
Echelus uropterus (Temminck and Schlegel, 1846): Shao et al., 2008: 238.

Specimen examined. NMMBP 2479, 3 specimens, 327-380 mm TL, Taiwan, no other data. NMMBP 5283 (formerly THUP 4176), 2 specimens, 294-330 mm TL, Tungkang, Pingtung, Taiwan, bottom trawl, 21 Jul. 1973.

Description. Head length 10.2-10.7%, predorsal length 12.8-13.1%, preanus length



Fig. 5. *Echelus uropterus* (Temminck and Schlegel, 1846), NMMBP 2479, 1 of 3, 380 mm TL. (upper) dorsal view ; (lower) lateral view of left head.

37.1-37.9%, trunk length 26.5-27.3%, tail length 62.7-63.9% in TL. Body depth 29.2-32.0%, snout length 24.4-24.9%, eye diameter 13.4-14.0%, mouth length

38.9-42.2% in HL. Number of lateral line pores: 9 anterior to pectoral fin base, 13-15 anterior to dorsal fin, 49-52 anterior to anus and 152-157 in total. Snout pointed, forming

an acute angle; eye relatively large; mouth cleft extends slightly beyond the rear margin of eye; upper jaw slightly overhanging the lower jaw. Teeth small and close set, none elongate; intermaxillary with a cluster of several pointed teeth, then a small cluster of knob-like teeth, followed by a wide band of knob-like on vomer; maxillary and mandibular dentition triserial. Pectoral fin present and rounded posteriorly; origin of dorsal fin at same level of posterior margin of pectoral fin; caudal fin present but not clear; posterior ends of dorsal fin and anal fin black, both connected to the unobvious caudal fin posteriorly.

Remark. This species is commonly collected by shrimp trawlers in northeastern and southwestern Taiwan. Although there are specimens deposited in the collections, none had been reported until Shao et al. (2008) provided a checklist of fishes of southern Taiwan. A description is provided herein for the taxonomic purpose.

Family Ophichthidae

***Neenchelys parvipectoralis* Chu, Wu and Jin, 1981**

微鰭新鰻

Fig. 6



Fig. 6. *Neenchelys parvipectoralis* Chu, Wu and Jin, 1981, NMMBP 2912, 1 of 6, 205 mm TL. (upper) lateral view ; (lower) lateral view of right head.

Neenchelys parvipectoralis Chu, Wu and Jin, 1981: 24 (Type locality: Pingtan Island, Fujian Province, China).

Specimen examined. NMMBP 2912, 6 specimens, 162-238 mm TL, Taiwan, no other data.

Description. Head length 9.5-11.1%, predorsal length 15.9-16.5%, preanus length 41.2-42.5%, trunk length 30.8-32.8%, tail length 57.1-58.9% in TL. Body depth 34.1-45.5%, snout length 14.4-16.8%, eye diameter 5.2-6.7%, mouth length 24.9-30.5% in HL. Number of lateral line pores: 12-13 anterior to pectoral fin base, 20-21 anterior to dorsal fin, 52-56 anterior to anus and 135-138 in total. Body cylindrical and relatively stout; anterior part of head much thinner than the rest of head and body; snout pointed, forming an acute angle; eye relatively small; posterior nostril a short cleft, situated at lower and anterior corner of eye; upper jaw slightly overhanging the lower jaw; mouth cleft extends well beyond the rear margin of eye. Teeth small and conical; intermaxillary with few enlarged pointed teeth, followed by a biserial band of enlarged teeth on vomer; maxillary and mandibular dentition with a single series of small teeth. Pectoral fin present but minute; origin of dorsal fin about 1/2 head length posterior to pectoral fin; caudal fin present; dorsal and anal fins connected to the caudal fin posteriorly. Body uniformly light brown without any pigmentation; skin near translucent and muscle visible.

Remark. This species was rarely mentioned since it was described in 1982. The Catalog of Fishes currently lists this species with an uncertain status (Eschmeyer, 2010). Our examination shows that this is clearly a distinct species from all other congeners. These specimens represent the first record from Taiwan.

***Phylloichthys xenodontus* Gosline, 1951**

葉鼻鰻

Fig. 7

Phylloichthys xenodontus Gosline, 1951: 316 (Type locality: Hauula Park, Oahu Island, Hawaiian Islands, U.S.A., Central Pacific).

Specimen examined. NMMBP 2753, 1 specimen, 280 mm TL, Taiwan, no other data. NMMBP 5264 (formerly THUP 3881), 2 specimens, 375-420 mm TL, Hsiao-liu-chiu, Pingtung, Taiwan, bottom trawl, 20 Mar. 1973.

Description. Head length 9.0-10.4%, predorsal length 7.1-9.3%, preanus length 50.5-51.2%, trunk length 40.7-42.7%, tail length 48.5-50.7% in TL. Body depth 34.2-34.5%, snout length 25.7-27.6%, eye diameter 7.9-8.6%, mouth length 37.2-41.4% in HL. Number of lateral line pores: 9-10 anterior to pectoral fin base, 9-10 anterior to dorsal fin, 76-77 anterior to anus and 150-158 in total. Body cylindrical and very slender, becoming compressed toward the tail; snout relatively long, pointed, forming an acute angle; eye well developed,



Fig. 7. *Phyllophichthus xenodontus* Gosline, 1951, NMMBP 5264, 1 of 2, 420 mm TL. (upper) dorsal view ; (lower) lateral view of right head.

relatively small; anterior nostril with a large leaf-like appendage; upper jaw extended far beyond the lower jaw anteriorly; mouth cleft extends slightly beyond the rear margin of eye. Teeth conical; intermaxillary with a small cluster of pointed teeth; vomer without teeth; maxillary teeth uniserial and relatively weak; mandibular with a single series of enlarged teeth, directed laterally. Pectoral fin elongated; origin of dorsal fin about same level of origin of the pectoral fin; posterior end of tail with a flashy point, instead of caudal fin; dorsal and anal fins disconnected posteriorly. Body brownish above and paler below, without any mark.

Remark. Our specimens otherwise agree with the original description, except for the intermaxillary teeth are slightly variant in arrangement. These specimens represent the first record in Taiwan, as well as the northwestern Pacific Ocean.

Acknowledgement

The authors express sincere appreciations to Miss Y.C. Chu for curatorial assistance. This study was supported by the National Museum of Marine Biology and Aquarium (NMMBA99100207) and the National Science Council (NSC962621B001006MY3 and NSC962628B001006MY3).

References

- Böhlke, E.B. 1989. Methods and Terminology, Pp. 1-7. In: Böhlke, E.B. (ed). Fishes of the western North Atlantic. Sears Foundation for Marine Research, Memoir 1, Part 9, Volume 1, Anguilliformes and Saccopharyngiformes. Yale University, New Haven, Connecticut.
- Chen, J.T.F. & H.T.C. Weng. 1967. A review of the apodal fishes of Taiwan. Biological Bulletin Tunghai University, Ichthyology Series, 6: 1-86.
- Chen, J.T.F. & M.J. Yu. 1986. A synopsis of the vertebrates of Taiwan. Revised and enlarged edition. Commercial Press, Taipei, Volume II, 442 pp.
- Chen, Y.Y. 2002. Taxonomy, distribution and reproduction of deep-sea eels in Taiwan waters and the phylogeny of Anguilliformes and Congroidei (Elopomorpha: Teleostei). PhD dissertation, Institute of Marine Biology, National Sun Yat-sen University. Kaohsiung. 236 pp.
- Chen, Y.Y. & H.K. Mok. 2001. A new synphobranchid eel, *Dysonma longirostrum* (Anguilliformes: Synphobranchidae), from the northeastern coast of Taiwan. Zoological Studies, 40: 79-83.
- Chu, Y.T., H.L. Wu & X.B. Jin. 1981. Four new species of the families Ophichthyidae and Neenchelidae. Journal of Fisheries of China, 5: 21-27.
- Eschmeyer, W.N. (ed.) 2010. Catalog of Fishes, Online version of 6 May 2010. <http://research.calacademy.org/ichthyology/catalog/fishcatmain.asp>
- Fricke, R. & W.N. Eschmeyer. 2010. A guide to Fish Collections in the Catalog of Fishes database. Online version of 3 June 2010. <http://research.calacademy.org>
- Gosline, W.A. 1951. The osteology and classification of the ophichthid eels of the Hawaiian Islands. Pacific Science, 5: 298-320.
- Günther, A. 1870. Catalogue of the fishes in the British Museum. Volume 8. British Museum, London, 549 pp.
- Ho, H.C., C.C. Lin, Y.M. Ju, S.I. Wang, K.T. Shao & C.W. Chang. 2009. Specimen catalog of pieces collection of National Museum of Marine Biology and Aquarium transferred from Tunghai University. (I) Order Pleuronectiformes.

- Platax 6: 1-16.
- Jordan, D.S. & B.W. Evermann. 1902. Notes on a collection of fishes from the island of Formosa. Proceedings of the United States National Museum, 25(1289): 315-368.
- Jordan, D.S. & R.E. Richardson. 1909. A catalogue of the fishes of the island of Formosa, or Taiwan, based on the collections of Dr. Hans Sauter. Memoirs of the Carnegie Museum, 4: 159-204.
- Karmovskaya, E.S. 1994. Systematics and distribution of the eel genus *Gavialiceps* (Congridae) in the Indo-West Pacific. Journal of Ichthyology, 34: 73-89.
- McCosker, J.E. & Y.Y. Chen. 2000. A new species of deepwater snake-eel, *Ophichthus aphotistos*, with comments on *Neenchelys retropinna* (Anguilliformes: Ophichthidae) from Taiwan. Ichthyological Research, 47: 353-357.
- Randall, J.E. & K.K.P. Lim. 2000. A checklist of the fishes of the South China Sea. The Raffles Bulletin of Zoology, Supplement 8: 569-667.
- Robins, C.H. & C.R. Robins. 1976. New genera and species of dysommene and synaphobranchine eels (Synaphobranchidae) with an analysis of the Dysommeneae. Proceedings of the Academy of Natural Sciences of Philadelphia, 127: 249-280.
- Shao, K.T. 2010. Taiwan Fish Database. WWW Web electronic publication. Version 2009/1 of 19 June 2010. <http://fishdb.sinica.edu.tw>
- Shao, K.T., H.C. Ho, P.L. Lin, P.F. Lee, M.Y. Lee, C.Y. Tsai, Y.C. Liao, Y.C. Lin, J.P. Chen & H.M. Yeh. 2008. A checklist of the fishes of southern Taiwan, northern South China Sea. The Raffles Bulletin of Zoology, Supplement 19: 233-271.
- Shen, S.C., S.C. Lee, K.T. Shao, H.K. Mok, C.T. Chen & C.H. Chen. 1993. Fishes of Taiwan. Department of Zoology, National Taiwan University, Taipei, 960 pp.
- Smith, D.G. & J.E. Böhlke. 1983. *Neenchelys retropinna*: a new worm eel (Pisces: Ophichthidae) from the Indian Ocean. Proceedings of the Academy of Natural Sciences of Philadelphia, 135: 80-84.
- Temminck, C.J. & H. Schlegel. 1846. Fauna Japonica, sive descriptio animalium quae in itinere per Japoniam suscepto annis 1823-30 collegit, notis observationibus et adumbrationibus illustravit P. F. de Siebold. Pisces. Parts 10-14: 173-269.

國立海洋生物博物館典藏東海大學轉移之魚類標本目錄 (II) 鰻形目

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摘 要

本系列研究根據最新的分類學進展，重新檢視自東海大學轉移至國立海洋生物博物館的鰻形目魚類標本之學名有效性，並重新編號歸類。檢視所有的240筆618尾鰻形目魚類標本，計鑑定出9科35屬59種。其中確認陳及翁 (1967) 描述的短突糯鰻 (*Rhynchoconger brevirostris* (= *Macrocephenchelys brevirostris*))、陳氏油鰻 (*Myrophis cheni* (= “*Neenchelys*” *cheni*))、台灣絲尾海鰻 (*Chlopsis taiwanensis* (= *Gavialiceps taiwanensis*)) 及黑尾前肛鰻 (*Dysomma melanurum*) 之模式標本，四魚種並另立選模。此外，亦確定及描述蠕鰻 (*Echelus uropterus*)、微鰭新鰻 (*Neenchelys parvipectoralis*) 及葉鼻鰻 (*Phyllophichthus xenodontus*) 等三個台灣新記錄種。本文提供該批鰻形目魚類標本之新舊編號對照目錄。

關鍵詞：分類學，鰻形目，選模，蠕鰻，微鰭新鰻，葉鼻鰻。