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An annotated checklist of the chondrichthyans of Taiwan

DAVID A. EBERT^{1,2,3}, WILLIAM T. WHITE⁴, HSUAN-CHING HO^{5*}, PETER R. LAST⁴, KAZUHIRO NAKAYA⁶,
BERNARD SÉRET⁷, NICOLAS STRAUBE⁸, GAVIN J. P. NAYLOR⁸ & MARCELO R. DE CARVALHO⁹

¹*Pacific Shark Research Center, Moss Landing Marine Laboratories, 8272 Moss Landing Road, Moss Landing, CA 95039, USA.*

E-mail (DAE): debert@mlml.calstate.edu

²*Research Associate, Department of Ichthyology, California Academy of Sciences, 55 Music Concourse Drive, San Francisco, CA. 94118, USA*

³*Research Associate, South African Institute for Aquatic Biodiversity, Private Bag 1015, Grahamstown, 6140, South Africa*

⁴*CSIRO Marine & Atmospheric Research, Wealth from Oceans Flagship, GPO Box 1538, Hobart, TAS 7001, Australia.*

E-mail: william.white@csiro.au

⁵*National Museum of Marine Biology & Aquarium, Checheng, Pingtung 944, Taiwan; Institute of Marine Biodiversity and Evolutionary Biology, National Dong Hwa University. E-mail: ogcoho@gmail.com*

⁶*Hokkaido University, 3-1-1, Hakodate, Hokkaido 041-8611, Japan, E-mail: bxx03120@nifty.com*

⁷*IRD Muséum national d'Histoire naturelle, Département Systématique et Evolution, 55 rue Buffon, case postale 51, 75231 Paris cedex 05, France. E-mail: seret@mnhn.fr*

⁸*Hollings Marine Laboratory, 331 Fort Johnson Rd, Charleston, SC 29412, USA. E-mails: nstraube09@googlemail.com (NS), gjpnaylor@gmail.com (GN)*

⁹*Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, Travessa 14, nº 101, CEP 05508-900, São Paulo, SP, Brazil. E-mail: mrcarvalho@ib.usp.br*

**Corresponding author.*

Abstract

An annotated checklist of chondrichthyan fishes (sharks, batoids, and chimaeras) occurring in Taiwanese waters is presented. The checklist is the result of a biodiversity workshop held in Mach 2012 as well as on-going systematic revisions by the authors. The chondrichthyan fauna of Taiwan is one of the richest in the world with the number of species totaling 181, comprising 52 families and 98 genera. It includes 31 families, 64 genera, and 119 species of sharks, 19 families, 31 genera, and 58 species of batoids, and 2 families, 3 genera, and 4 species of chimaeras. The most species-rich families are the Carcharhinidae with 22 species followed by the Scyliorhinidae with 17. The most species-rich batoid families are the Dasyatidae with 11 species and the Rajidae with 10. Verified voucher material is provided for each species where available and potential taxonomic issues are high-lighted when applicable. This represents the first detailed, evidence-based checklist of chondrichthyans from Taiwanese waters in over 40 years.

Key words: Biodiversity, Sharks, Batoids, Chimaeras, Taiwan

Introduction

A biodiversity workshop and survey was held in Taiwan in March 2012 with a group of international chondrichthyan experts coming together to meet at the National Museum of Marine Biology and Aquarium (NMMBA) to investigate the species of sharks, rays and chimaeras occurring in Taiwanese waters. A variety of taxonomic papers resulting from this workshop are contained in this special issue. The checklist presented herein is the most comprehensive dedicated to chondrichthyans in Taiwan in nearly forty years. The project set out to investigate and examine the most problematic chondrichthyan groups in this region, and to clarify, confirm, and identify the taxonomic status of those species reported to occur in Taiwanese waters. Taiwanese fish markets were surveyed by the authors to identify the species that were being landed either in directed fisheries or as bycatch, continuing an effort initiated at least in the late 1980s by one of us (DAE) and presently continued with renewed intensity by some of the authors. Chondrichthyan specimens in museum collections were also examined to verify

species identification. An exhaustive search of the literature was also undertaken. Although not all taxonomic issues could be resolved within the allocated timeframe of this volume, it is expected that this checklist will lay the groundwork for further improving the identification and occurrence of chondrichthyans in Taiwanese waters.

Methods

The checklist classification follows Ebert *et al.* (2013), a modification of Nelson (2006), and Didier *et al.* (2012) for the sharks, batoids and chimaeras, respectively, and includes the authorship, type designation for genera and species, the status and deposition of type material, and the type locality if available. Following the scientific name of a species are the common name in English and Chinese and the local synonymy for all Taiwanese taxa, including authors. Each species account has a subsection on Taiwanese voucher specimens and includes, when available, institutional acronyms following Sabaj Pérez (2013), institutional accession numbers and additional deposition information including specimen TL, sex, location of capture, data of capture, and collector, if known. A remarks subsection follows with information on the taxonomic history, including nomenclature and systematics, if applicable, and status of each species found in Taiwanese waters. The first author to report a particular species from Taiwan is underlined in the synonymy. Author initials denote personal field observations or unpublished data. The end of each species account has the current conservation Red List Assessment status as evaluated by the IUCN Species Survival Commission Shark Specialist Group (<http://www.iucnredlist.org>). Every attempt was made to confirm the occurrence of all species reported from Taiwanese waters, whether native or non-native, even, in some instances, when it may no longer occur there or is being reported for the first time. Where the taxonomic status of a species is uncertain, this is documented in the remarks section. The new species described within this volume (see contribution by Last *et al.*) is presented here in the checklist. Finally, several of the species groups are still under investigation and their taxonomic status may change in the future.

Order Hexanchiformes

Family Chlamydoselachidae Garman, 1884

Frilled sharks / 皺鰓鯊科

Genus *Chlamydoselachus* Garman, 1884

Frilled sharks / 皺鰓鯊屬

Chlamydoselachus Garman, 1884:47, 52 (pp. 8, 13 in separate). Type species: *Chlamydoselachus anguineus* Garman, 1884, by monotypy.

Chlamydoselachus anguineus Garman, 1884

Frilled shark / 皺鰓鯊

Chlamydoselachus anguineus Garman, 1884:47, fig. Holotype: MCZ 800-S, female, probably adult ~1510 mm TL with caudal tip missing, from "Japanese seas" (probably southeastern Honshu).

Local synonymy: *Chlamydoselachus anguineus*: Joung *et al.*, 1989: 240, fig. 2; Ebert, 1990: 68; Chen & Joung, 1993: 33, pl. 1.2; Ebert & Compagno, 2009: 16; Shen & Wu, 2011: 76, fig.

Taiwan voucher material: (6 spec.) DAE 881204, adult male 1252 mm TL, Da-xi, 12 Apr 1988; DAE 882104, adult female 1571 mm TL, Cheng-gong, 21 Apr 1988; DAE 882304, adult male 1410 mm TL, 22°26'N, 120°30'E, Dong-gang, 23 Apr 1988; AMNH 258163, 852 mm TL, female, MNHN 2013-0451 (tissue accession GN10068), female 1222 mm TL, Da-xi, 15 Mar 2012; NMMP-P HO-034 (tissue accession GN9921), juvenile male 1326 mm TL, Da-xi, 13 Mar 2012.

Remarks: Ebert (1990; unpubl. data) collected three specimens in April 1988, one of which was reported by Joung *et al.* (1989: fig. 2). Detailed collection information on all three specimens can be found in Ebert (1990) and Ebert & Compagno (2009). This is not uncommon at fish markets around Taiwan where deep-sea bottom trawl fisheries occur.

Conservation status: Data Deficient.

Family Hexanchidae Gray, 1851

Cow Sharks / 六鰓鯊科

Genus *Hepranchias* Rafinesque, 1810a

Sharpnose Sevengill Sharks / 七鰓鯊屬

Hepranchias Rafinesque, 1810a: 13. Type species: "*Squalus cinereus* Lacépède" by original designation, equals *S. cinereus* Gmelin in Linnaeus & Gmelin, 1789 and a junior synonym of *Squalus perlo* Bonnaterre, 1788.

Hepranchias perlo (Bonnaterre, 1788)

Sharpnose Sevengill Shark / 尖頭七鰓鯊

Squalus perlo Bonnaterre, 1788: 10. Holotype unknown. Type locality: "La Méditerranée [Mediterranean Sea]".

Local synonymy: *Hepranchias perlo*: Teng, 1958: 1, fig. 1; Teng, 1962: 33, fig. 6; Chen, 1963: 4; Shen, 1984a: 50, fig.; Chen & Yu, 1986: 108; Ebert, 1990: 70, tab. 3.2; Chen & Joung, 1993: 33–34, pl. 1.3; Shen & Wu, 2011: 77, fig.

Taiwan voucher material: (39 spec.) DAE 880904-01, adult male 746 mm TL, Da-xi, 9 Apr 1988; DAE 881104-01, adult male 780 mm TL, DAE 881104-02, adult male 795 mm TL, Da-xi, 11 Apr 1988; DAE 881204-01, juvenile female 681 mm TL, DAE 881204-02, adult female 965 mm TL, DAE 881204-03, juvenile female 842 mm TL, DAE 881204-04, adolescent male 727 mm TL, DAE 881204-05, adolescent male 674 mm TL, DAE 881204-06, adult female 1130 mm TL Da-xi, 12 April 1988; DAE 881604-01, adult female 1030 mm TL, Da-xi, 16 Apr 1988; DAE 880605-01, adult male 955 mm TL Da-xi, 6 May 1988; DAE 880705-01, adult male 865 mm TL, Da-xi, 7 May 1988; DAE 880905-01, adolescent female 891 mm TL, DAE 880905-02, adolescent female 980 mm TL, DAE 880905-03, adult male 955 mm TL, Da-xi, 9 May 1988; DAE 881005-01, adult female 1025 mm TL, Da-xi, 10 May 1988; DAE 881205-01, juvenile female 841 mm TL, Da-xi, 12 May 1988; DAE 881305-01, adult female 1073 mm TL, Da-xi, 13 May 1988; DAE 881405-01, juvenile female 871 mm TL Da-xi, 14 May 1988; DAE 882005-01, juvenile female 725 mm TL, DAE 882005-02, adolescent male 765 mm TL, DAE 882005-03, juvenile female 635 mm TL, DAE 882005-04, 750 mm TL, adolescent male, DAE 882005-05, juvenile male 690 mm TL Da-xi, 20 May 1988; DAE 882205-01, juvenile female 592 mm TL, Da-xi, 22 May 1988; DAE 882505-01, adult female 1100 mm TL, Da-xi, 25 May 1988; DAE 882605-01, adult female 1005 mm TL, Da-xi, 26 May 1988; DAE 882705-01, adult female 1003 mm TL, DAE 882705-02, adult female 1073 mm TL, DAE 882705-03, adult female 1040 mm TL, DAE 882705-01, 1185 mm TL, adult female, Da-xi, 27 May 1988; DAE 882805-02, 885 mm TL, adolescent female, Da-xi, 28 May 1988; CSIRO H 7393-01 (tissue accession GN10096), female 597 mm TL, 22°26'N, 120°30'E, Dong-gang, 3 Mar 2012; NMMB-P HO-186 (tissue accession GN10073), female 900 mm TL, Da-xi, 15 Mar 2012; NMMB-P HO-211, adult male 853 mm TL, Dong-gang, 23 Feb 2012; MNHN 2013-0464, juvenile male 518 mm TL, Dong-gang, 19 Mar 2012; AMNH 258164, juvenile male 591 mm TL, HUMZ 213820, adult male 874 mm TL; NMMB-P HO-229 (tissue accession GN10116), female 630 mm TL, Dong-gang, 19 Mar 2012.

Remarks: The species, first reported from Taiwan by Teng (1958) from Da-xi, Yilan, is relatively common at fish markets, especially Da-xi fish market, along the east coast and the landing ground of Dong-gang in the south part of the island.

Conservation status: Near Threatened.

Genus *Hexanchus* Rafinesque, 1810a

Sixgill Sharks / 六鰓鯊屬

Hexanchus Rafinesque, 1810a: 14. Type species: "*Squalus griseus* Lacépède", by original designation, a junior synonym of *Squalus griseus* Bonnaterre, 1788.

Hexanchus griseus (Bonnaterre, 1788)

Bluntnose Sixgill Shark / 灰六鰓鯊

Squalus griseus Bonnaterre, 1788: 9. Types unknown according to Boeseman in Hureau & Monod (1973). Type locality: "La Méditerranée [= Mediterranean Sea]".

Local synonymy: Hexanchus griseus: (?)Nakamura, 1936: 7, fig. 1, pl. 1 [fig. & plate possibly of *H. nakamurai*]; Shen, 1984a: 50; Chen & Yu, 1986: 108; Ebert, 1990: 45; Chen & Joung, 1993: 34, pl. 1.4 (captioned as *H. griseus*, but actually *H. nakamurai*); Shao *et al.*, 2008: 237; Shen & Wu, 2011: 77, fig. [figure captioned as *H. griseus* is actually a *H. nakamurai*]. *Hexanchus griseus nakamurai*: Chen, 1963: 6.

Taiwan voucher material: TFRI uncat., 938 mm TL, female; National Taiwan Ocean University uncat., 2000 mm SL, female. One of us (DAE, May 1988) examined an individual at the Da-xi fish market that was estimated to be about 4 m TL, but had been partially processed prior to examination. The very large size, broad blunt head, and presence of six large, comb-shaped, anterolateral lower teeth, confirm the identification of this species as *H. griseus*. The dried jaws of another specimen apparently landed in Keelung fish market, estimated in excess of 2 m TL, was also examined, but no further information was available on this latter individual.

Remarks: Hexanchus griseus does not appear to be nearly as common at the fish markets around Taiwan as the bigeye sixgill, *H. nakamurai* (Ebert, 1990, pers. obs.). Records of *H. griseus* in the Taiwanese literature are probably unreliable as most illustrations and photographs appear to be of *H. nakamurai*. This includes the original records of this species by Nakamura (1936), which is actually *H. nakamurai* based on the figure. Subsequent figures and photographs captioned as *H. griseus*, including Chen & Joung (1993), appear to be *H. nakamurai*. Specimens of *H. griseus* caught in Taiwanese waters should be retained as voucher specimens and placed in a museum collection.

Conservation status: Near Threatened.

Hexanchus nakamurai Teng, 1962

Bigeye Sixgill Shark / 大眼六鰓鯊

Hexanchus griseus nakamurai Teng, 1962: 30, fig. 5. Holotype: TFRI 2515, 750 mm TL male, probably juvenile, Keelung, Taiwan [lost]. Neotype: NMMP-P 15835, 1565 mm TL mature male, Cheng-gong, Taiwan, 22°58' N, 120°08' E, 29 Mar 2011, collected at fish market by H.-C. Ho.

Local synonymy: Hexanchus griseus: ?Nakamura, 1936: 7, fig. 1, pl. 1; *Hexanchus griseus nakamurai*: Teng, 1962: 30, fig. 5; Chen, 1963: 6; Chen & Yu, 1986: 108. *Hexanchus vitulus*: Chen & Joung, 1993: 34, pl. 1.5 (captioned as *H. griseus*), 1.5. *Hexanchus nakamurai*: Ebert, 1990: 54; Shao *et al.*, 2008: 237; Ho & Shao, 2011: 9, 18; Shen & Wu, 2011: 77, fig. *Hexanchus griseus*: Shen & Wu, 2011: 77, fig. [figure is of *H. nakamurai*].

Taiwan voucher material: Neotype: NMMP-P 15835, 1565 mm TL mature male, Cheng-gong, Taiwan, 22°58'N, 120°08'E, 29 Mar 2011, coll. H.-C. Ho (neotype designated in Ebert *et al.*, this volume). Other specimens (8): NMMP-P15782, mature female, 1683 mm TL, Cheng-gong, Taiwan, 25 Dec 2010, coll. H.-C. Ho; CAS 235382,

juvenile female 958 mm TL, Da-xi, 25 May 2005; DAE 881504, juvenile male 482 mm TL, Su-ao, 15 Apr 1988; TFRI uncat., juvenile female 860 mm TL, 22°26'N, 120°30'E, Dong-gang, 23 Apr 1988; TFRI uncat., female 1155 mm TL, TFRI uncat., adult male 1526 mm TL, TFRI uncat., female 1230 mm TL, 22°36'N, 120°17'E, Hsiao-liu-chiu, 28 Apr 1988; NMF 0295, juvenile male 845 mm TL, 25°00'N, 121°50'E, Keelung, 7 Apr 1988.

Remarks: Teng (1962) described *Hexanchus griseus nakamurai* as a subspecies of *H. griseus* noting several distinctive morphological characteristics, including a concave posterior margin of the pectoral fin, a longer caudal peduncle, a long interspace between the pelvic and anal fins, and the origin of the dorsal fin located more anterior to the anal fin. He further commented that what Nakamura (1936) called *H. griseus* (fig. 1, pl. 1) was actually *H. nakamurai* (Teng, 1962). Chen (1963) considered *H. g. nakamurai* a junior synonym of *H. griseus*, but provided no figures and only a brief description of a 989 mm TL specimen figured by Nakamura (1936: fig. 1), which is actually a *H. nakamurai*.

Ebert (1990) compared morphological and meristic data of *H. nakamurai* from Taiwan and other regions, and to the holotype and paratype of *H. vitulus*, and concluded that these two species were identical, with *H. nakamurai* having priority. Taniuchi & Tachihawa (1991) also synonymised these two species, but did not provide any material basis for their conclusion. However, in a recent molecular study Naylor *et al.* (2012) found western Indian Ocean *H. nakamurai* to differ from a *H. vitulus* specimen from the Bahamas. Additional material, morphological and molecular, from the western North Pacific and western North Atlantic, and elsewhere may help elucidate the status of this species. The holotype of this species appears to have been lost despite extensive searches for it by the authors dating back to 1988. Therefore, Ebert *et al.* (2013) designated a neotype for this species. *Hexanchus nakamurai* appears to be far more common in fish markets around Taiwan, especially where deep-sea fisheries take place, than *H. griseus*, which appears to be relatively rare in Taiwanese waters.

Conservation status: Data Deficient.

Genus *Notorynchus* Ayres, 1855

Broadnose Sevengill Sharks / 油夷鯊屬

Notorynchus Ayres, 1855: 77. Type species: *Notorynchus maculatus* Ayres, 1855, by original designation, a junior synonym of *Squalus cepedianus* Péron, 1807.

***Notorynchus cepedianus* (Péron, 1807)**

Broadnose Sevengill Sharks / 油夷鯊

Squalus cepedianus Péron, 1807: 337. Holotype unknown. Type locality: Adventure Bay, Tasmania.

Local synonymy: *Heptranchias pectorosus*: Teng, 1958: 3, fig. 2; Chen, 1963: 4; Chen & Yu, 1986: 108. *Notorynchus pectorosus*: Teng, 1962: 36, fig. 7; Shen, 1984a: 50, fig. *Notorynchus cepedianus*: Ebert, 1990: 60; Chen & Joung, 1993: 34, pl. 1.6; Shen & Wu, 2011: 77, fig.

Taiwan voucher material: TFRI 102193, 1930 mm TL (examined by DAE in 1988).

Remarks: *Notorynchus cepedianus* occurs from the Sea of Japan, along the Korean Peninsula, to the Yellow Sea and East China Sea southwards to the Taiwan Strait as far south as Xiamen along the Chinese mainland coast and off the west coast of Taiwan (Ebert, 1990). It appears to be very rare in fish markets in Taiwan. Ebert (1990) examined the only voucher material in April 1988 and confirmed its identification.

Conservation status: Data Deficient.

Order Squaliformes. Dogfish sharks.

Family Echinorhinidae Gill, 1862

Bramble Sharks / 笠鱗鯊科

Genus *Echinorhinus* Blainville, 1816

Bramble Sharks / 笠鱗鯊屬

Echinorhinus Blainville, 1816: (8), 121 (genus *Squalus* Linnaeus, 1758). Type species: "*Spinusus*" = *Squalus spinosus* Gmelin, in Linnaeus and Gmelin, 1789, by monotypy.

***Echinorhinus cookei* Pietschmann, 1928**

Prickly Shark / 庫氏笠鱗鯊

Echinorhinus cookei Pietschmann, 1928: 297; also separately described by Pietschmann, 1930: 3, fig 1, pl.1. Holotype: Bernice P. Bishop Museum, adult male 2033 mm TL, from deep water along south coast of Kauai Island, Hawaiian Islands, disintegrated according to Eschmeyer (2012). Neotype: NMNZ P. 2774, 1980 mm adult (or adolescent?) male, Cook Strait, designated by Garrick, 1960: 110.

Local synonymy: Echinorhinus brucus: Teng, 1958: 28, fig. 18 (TFRI 102894, 2880 mm TL, Su-Ao); Teng, 1962: 175, fig. 44; Chen, 1963: 97; Shen, 1984a: 67, fig.; Chen & Yu, 1986: 114. *Echinorhinus cookei*: Chen & Joung, 1993: 35, pl. 1.7; Shen & Wu, 2011: 79, fig.

Taiwan voucher material: TFRI 102894, 2880 mm SL (examined by DAE in 1988); NMMB-P 15853, 2310 mm TL, Cheng-gong, 7 Nov 2011; NMMB-P 15711, Cheng-gong, 2 Oct 2011.

Remarks: This species was originally reported as *E. brucus* by early researchers in Taiwan (Teng, 1958, 1962; Chen, 1963; Shen, 1984a; Chen & Yu, 1986), but illustrations and photographs, as well as examination of individuals at the TFRI in Keelung and at several fish markets, confirm the identification of this species as *E. cookei*.

Conservation status: Near Threatened.

Family Squalidae Blainville, 1816

Dogfishes / 角鯊科

Genus *Cirrhigaleus* Tanaka, 1912

Mandarin dogfishes / 鬚角鯊屬

Cirrhigaleus Tanaka, 1912: 151. Type species: *Cirrhigaleus barbifer* Tanaka, 1912, by original designation (also by monotypy).

***Cirrhigaleus barbifer* Tanaka, 1912**

Mandarin Dogfish / 長鬚卷盤鯊

Cirrhigaleus barbifer Tanaka, 1912: 151, pl. 41, figs 156–162. Holotype: ZUMT 3397, male 855 mm TL, from Tokyo fish market [lost, Eschmeyer (2012)].

Local synonymy: Cirrhigaleus barbifer: Chen & Yu, 1986: 112; Joung et al., 1989: 242, fig. 5 (NMF 345, 80 mm TL, NMF 492, 975 mm TL, Da-xi); Chen & Joung, 1993: 37, pl. 2; 2011: 81, fig.

Taiwan voucher material: (1 specimen) FRIP 22294, adult female 1150 mm TL, 23°20'N, 121°48.3'E, Wu-shih-bi, Cheng-gong, 20 Jun 2007.

*Remarks: An image by P. Kyne of a specimen landed at Penghu Islands in May 2005 was observed by one of us (WTW) and confirmed as this species. Only a few records of this species exist in Taiwan; sporadic distribution in the western North Pacific, from Indonesia (White et al., 2006) to Japan (Tanaka, 1912); previously considered to occur off southern Australia and New Zealand but this was recently described as a separate species, *Cirrhigaleus australis* White, Last & Stevens, 2007.*

Conservation status: Data Deficient.

Genus *Squalus* Linnaeus, 1758

Dogfishes / 角鯊屬

Squalus Linnaeus, 1758: 233. Type species: *Squalus acanthias* Linnaeus, 1758, by subsequent designation of Gill, 1862: 39.

***Squalus brevirostris* Tanaka, 1917**

Japanese Shortnose Spurdog / 短吻角鯊

Squalus brevirostris Tanaka, 1917: 464, pls. 129 (362–363), 130 (364). Holotype: ZUMT 7630, male 430 mm TL, probably from Shimonoseki, Japan, collected from the Tokyo fish market.

Local synonymy: Squalus brevirostris: Chen, 1948: 42; Liang, 1951: 3; White & Iglésias, 2011: 954, fig. 4a. Squalus megalops: Teng, 1962: 144, fig. 36; Chen, 1963: 89, fig. 27; Shen, 1984a: 66, fig.; Chen & Yu, 1986: 112; Joung et al., 1989: 241 (in key); Chen & Joung, 1993: 41, pl. 3; Shen & Wu, 2011: 81, fig.

Taiwan voucher material: (7 spec.) CAS 235390, female 435 mm TL, Da-xi, 22 May 2005; CSIRO H 6923-29 (GenBank accession EF539300), unsexed 440 mm TL, CSIRO H 6923-30 (GenBank accession EF539299), female 446 mm TL; CSIRO H 6923-31 (GenBank accession EF539298), female 435 mm TL, Da-xi, 22 May 2005; CAS 236071 (tissue accession GN10047), adult male 390 mm TL; AMNH 258171 (tissue accession GN10048), adult male 393 mm TL, Da-xi, 14 Mar 2012; MNHN 2013-0500 (tissue accession GN10075), female 503 mm TL Da-xi, 15 Mar 2012.

*Remarks: Commonly landed at s in eastern and southern Taiwan. Very similar to *Squalus megalops* (Macleay, 1881) and often placed in the synonymy of this species; a detailed taxonomic examination of the *Squalus megalops* complex in the Indo-West Pacific is required to help clarify the status of *S. brevirostris*.*

Conservation status: Data Deficient.

***Squalus formosus* White & Iglésias, 2011**

Taiwan Spurdog / 台灣高鰭角鯊

Squalus formosus White & Iglésias, 2011: 954, figs 1–3. Holotype: CSIRO H 6816-01, adult male 734 mm TL, 24°50' N, 121°22' E, Ta-Shi fish market, 11 Jul 2007.

Local synonymy: *Squalus blainvillei*: Compagno, 1984: 115, fig.; Joung *et al.* 1989: 241, fig. 4; Chen & Joung, 1993: 41, pl. 3; 2011: 81, fig. *Squalus blainvillei*: Chen & Yu, 1986: 111; Shao *et al.*, 2008: 237. *Squalus formosus*: White & Iglésias, 2011: 954, figs 1–3. *Squalus* sp. 1: Nakabo, 2002: 156, fig.

Taiwan voucher material: Holotype: CSIRO H 6816-01, adult male 734 mm TL, Da-xi, 11 Jul 2007. Other specimens (6): MNHN 2008–1939, juvenile female 514 mm TL, Da-xi, 11 Jul 2007; CSIRO H 6292-10 (GenBank accession EF539330), juvenile female 336 mm TL, Da-xi, 21 May 2005; CAS 236072-1 (tissue accession GN9922), 693 mm TL, adult male, Da-xi, 13 March 2012; CAS 236072-2 (tissue accession GN9923), 734 mm TL, adult male, Da-xi, 13 March 2012; HUMZ 213800 (tissue accession GN10045), 569 mm TL, juvenile male; HUMZ 213801, 562 mm TL, juvenile male, Da-xi, 14 Mar 2012.

Remarks: Commonly landed at some fish markets in eastern and southern Taiwan. Previously referred to as *Squalus blainvillei* (Risso, 1827) by most authors, but recently described as a new species endemic to Taiwanese and Japanese waters; most similar to *Squalus albifrons* Last, White & Stevens, 2007 from eastern Australia. This species belongs to a highfin-megalops subgroup which are characterised by a tall, upright first dorsal fin, a white posterior margin on caudal fin, and a short snout.

Conservation status: Not Evaluated.

Squalus japonicus Ishikawa, 1908

Japanese Spurdog / 日本角鯊

Squalus japonicus Ishikawa, 1908: 71. Syntypes: two males (one adult 700 mm TL), Sagami Bay, collected from Tokyo fish market, and one female from Kagoshima, whereabouts unknown (Chen *et al.*, 1979; Eschmeyer, 2012).

Local synonymy: *Squalus fernandinus*: Chen, 1963: 88 (in part). *Squalus japonicus*: Compagno, 1984: 117, fig.; Joung *et al.*, 1989: 241 (in key); Chen & Joung, 1993: 41, pl. 3; Shen & Wu, 2011: 81, fig.

Taiwan voucher material: (7 spec.) CSIRO H 6294-26, male 456 mm TL, CSIRO H 6294-27, female 380 mm TL, CSIRO H 6294-31, female 571 mm TL; UF 148932, male embryo 247 mm TL, Da-xi, 23 May 2005; MNHN 2013-0502 (tissue accession GN10054), juvenile male 490 mm TL; MNHN 2013-0503 (tissue accession GN10055), juvenile male 369 mm TL; MNHN 2013-0504 (tissue accession GN10056), juvenile male 459 mm TL; Nan-fang-ao, 14 Mar 2012.

Remarks: Commonly landed at some s in eastern and southern Taiwan. Western North Pacific populations of this species were previously referred to as *S. sucklii* by Garman (1913), *S. fernandinus* by Bigelow & Schroeder (1957) and Fowler (1941), and *S. mitsukurii* by Jordan & Fowler (1903); *S. japonicus* resurrected as a valid species by Chen *et al.* (1979). Previously considered to range from Japan to northern Australia but now considered a western North Pacific endemic, with Philippine, Indonesian and Australian populations recently described as a separate species, *Squalus nasutus* Last, Marshall & White, 2007.

Conservation status: Data Deficient.

Squalus montalbani Whitley, 1931

Shortspine Spurdog / 蒙氏角鯊

Squalus montalbani Whitley, 1931: 310. Holotype: USNM 70256, juvenile male 311 mm TL, off Sombrero Island, western coast of Luzon Island, 13°45'15"N, 120°46'30"E, Philippines, Albatross station 5111, depth ca. 425 m.

Local synonymy: Squalus mitsukurii: Nakamura, 1936: 42, pl. 16, fig. 2; Chen, 1948: 42; Compagno, 1984: 121, fig.; Joung *et al.*, 1989: 241 (name only in key to genus *Squalus* from Taiwan); Chen & Joung, 1993: 41, pl. 3; Shen & Wu, 2011: 82, fig. *Squalus fernandinus*: Chen, 1963: 88 (in part); Chen & Yu, 1986: 111.

Taiwan voucher material: (7 spec.) CAS 236073 (tissue accession GN10097), juvenile male 597 mm TL, Dong-gang, 16 Feb 2012; CSIRO H 7403-02 (tissue accession GN10173), female 651 mm TL, MNHN 2013-0505 (tissue accession GN10172), off Kaohsiung, 22°32'N, 120°07'E, 320 m depth, 21 March 2012; NMMB-P 9275, NMMB-P9262, Dong-gang, 18 Sep 2008; NMMB-P 15362, 590 mm SL, Dong-gang, 19 May 2011; NMMB-P15785, 835 mm TL, unknown location.

Remarks: Commonly landed at some fish markets in eastern and southern Taiwan. Previously considered to be *S. mitsukurii*, but recent morphological and molecular taxonomic work has indicated that *S. montalbani* ranges from temperate and tropical Australia, north to Indonesia and the Philippine Islands, and now its distribution can be extended to Taiwan; belongs to the *mitsukurii* subgroup which are characterised by a relatively low, raked first dorsal fin, a posterior margin of caudal fin white with a broad black bar centrally, and a moderately long snout. *Squalus mitsukurii* previously considered to be wide-ranging now appears likely to be restricted to the waters of the Koreas, Japan, and Mainland China.

Conservation status: Data Deficient.

***Squalus suckleyi* (Girard, 1854)**

North Pacific Spiny Dogfish / 薩氏角鯊

Spinax (Acanthias) suckleyi Girard, 1854: 196. Neotype: CAS 227267, adult male 674 mm TL, Hood Canal, Puget Sound, Washington, USA, 30 m depth, 47°22'N, 123°05'W, 3 Aug 2007.

Local synonymy: Squalus sucklii: Fowler, 1930: 495 (Formosa). *Squalus suckleyi*: Fowler, 1941: 258 (Formosa); Chen, 1948: 42. *Squalus acanthias*: Chen, 1963: 87 (THUP 2066, 225 mm TL); Chen & Yu, 1986: 111.

Taiwan voucher material: (1 specimen) NMMB-P 4293, Dong-gang, Pingtung, 1 Apr 1960.

Remarks: Known from few records off Taiwan, with no confirmed specimens recorded since 1960 from Taiwanese waters. Previously considered a junior synonym of *Squalus acanthias* Linnaeus, but a recent taxonomic study revealed that the North Pacific population is a separate species and *Squalus suckleyi* was resurrected for the North Pacific species (Ebert *et al.*, 2010). Taiwan likely represents the most southerly distribution of this species in the western North Pacific, with the limited records suggesting it is either rare in Taiwanese waters or has been extirpated.

Conservation status: Not Evaluated.

Family Centrophoridae Bleeker, 1859

Gulper Sharks / 刺鯊科

Genus *Centrophorus* Müller & Henle, 1837a

Gulper Sharks / 刺鯊屬

Centrophorus Müller & Henle, 1837a: 115. Type species: *Squalus granulosus* Bloch & Schneider, 1801, by monotypy.

***Centrophorus atromarginatus* Garman, 1913**

Dwarf Gulper Shark / 黑緣刺鯊

Centrophorus atromarginatus Garman, 1913: 200, pl. 13, figs 1–4. Holotype: MCZ 1117-S, female, 870 mm, Suruga Gulf, Japan; type was erroneously re-catalogued as MCZ 1455-S (Hartel & Dingerkus, 1997).

Local synonymy: Centrophorus armatus: Chen, 1963: 91; Chen & Cheng, 1982: 145; Chen & Yu, 1986: 112. *Centrophorus armatus barbatus*: Teng, 1962: 151, fig. 38. *Centrophorus atromarginatus*: Yang, 1979: 206; Chen & Yu, 1986: 112; White *et al.*, 2013: this volume.

Taiwan voucher material: (1 specimen) CAS 234956, adult male 583 mm TL, Da-xi, 5 May 1988. *Centrophorus armatus barbatus*, holotype, TFRI 34, adult male 591 mm TL, Da-xi (examined by DAE).

Remarks: The holotype of *C. armatus barbatus* has been examined by one of us (DAE) and compared to the holotype of *C. atromarginatus*, and found to be conspecific with each other. One of us (DAE) found this species to be relatively common at the Da-xi and Su-ao s during a survey in April-May 1988, but more recent visits to these fish markets over the past decade have yielded relatively few records for this species in Taiwan. Teng (1962) proposed a new subspecies for a gulper shark found off Taiwan, *C. armatus barbatus*, which is a junior synonym of *C. atromarginatus*.

Conservation status: Data Deficient.

***Centrophorus granulosus* (Bloch & Schneider, 1801)**

Gulper Shark / 顆粒刺鯊

Squalus granulosus Bloch & Schneider, 1801: 135. Holotype: ZMB, whereabouts unknown; no locality. Neotype: AMNH 78263, female 1241 mm, Puerto Santa Cruz de Tenerife, Canary Islands, Spain; neotype designation by White *et al.* (2013).

Local synonymy: Centrophorus acus: Chen & Cheng, 1982: 143, fig. 2; Yu, 1988: 3; Chen & Joung, 1993: 36, pl. 1 (fig. 8); Hsu & Joung, 2004: 184; Shen & Wu, 2011: 82, fig. (Taiwan). *Centrophorus granulosus*: White *et al.*, 2013: this volume, figs 1–9, 15a. *Centrophorus harrissoni*: Chen, 1963: 93. *Centrophorus niaukang*: Teng, 1959e: 1, pl. 1, figs 1 & 2; Teng, 1962: 159, fig. 40; Yang, 1979: 205, fig. 1; Chen & Cheng, 1982: 143, fig. 5; Chen & Yu, 1986: 112; Chen & Joung, 1993: 37, pl. 2, fig. 1; Nakabo, 2002: 153, fig.; Hsu & Joung, 2004: 185; Ho & Shao, 2011: 9; Shen & Wu, 2011: 83, fig.

Taiwan voucher material: (36 spec.) CAS 234955, newborn or aborted embryo male 308 mm TL, Da-xi, 26 May 2005; CSIRO H 6292–13, newborn female 392 mm TL, Da-xi, 21 May 2005; FRIP 3674, adult male 1167 mm TL, northeastern Taiwan; FRIP 3660; NMMB-P 15807, juvenile female 952 mm TL, NMMB-P 15808, juvenile female 874 mm TL, NMMB-P 15809, female 1194 mm TL. Additional specimens listed in White *et al.* (2013).

Remarks: Commonly landed by deepwater trawling and longlining off eastern and southern Taiwan. Taxonomic examination of material from around the world has revealed that *Centrophorus niaukang* and *C. acus* are junior synonyms of *C. granulosus*, a larger species (>1.5 m TL) occurring in the Atlantic and Indo-West Pacific Oceans (White *et al.*, 2013, this volume). *Centrophorus robustus* Deng, Xiong & Zhan 1985, described from the East China Sea, is probably a junior synonym of this species. One of us (DAE) during a survey in April-May 1988 found this species to be relatively uncommon at fish markets on the east coast compared to *C. atromarginatus*, a

more common *Centrophorus* species at the time. More recent surveys reveal *C. atromarginatus* to be uncommon now relative to *C. granulatus*.

Conservation status: Vulnerable, but not relevant to current nomenclature. *Centrophorus niaukang* and *C. acus* listed as Near Threatened.

Centrophorus isodon (Chu, Meng & Liu, 1981)

Blackfin Gulper Shark / 等齒刺鯊

Pseudocentrophorus isodon Chu, Meng & Liu, 1981: 100, fig. Holotype: SCSFI 719, male 630 mm, Xisha (Paracel) Islands, South China Sea.

Local synonymy: *Centrophorus armatus*: Chen & Cheng, 1982: 143, fig. 3 (NMF 9). ?*Centrophorus uyato*: Hsu & Joung, 2004: 185 (based on detail of long narrow snout).

Taiwan voucher material: (1 specimen) FRIP 03661, no data.

Remarks: Drawing of *C. armatus* in Chen & Cheng (1982) appears to be this species based on the short first dorsal fin, greatly produced pectoral fin free rear tips and long snout in ventral view; specimen location not known. Only known from morphometric measurements and a photograph of a specimen from Taiwan in April-May 1988 (Ebert, unpubl.). The nomenclature and status of this taxon needs to be critically re-evaluated. The relationship of this species to *Centrophorus tessellatus* Garman, 1906 from Japan also needs further work.

Conservation status: Data Deficient.

Centrophorus cf. lusitanicus

Lowfin Gulper Shark / 低鰭刺鯊

Local synonymy: *Centrophorus lusitanicus*: Teng, 1958: 25, fig. 16 (Yilan, Kaohsiung); Teng, 1962: 155, fig. 39 (Tashi); Chen, 1963: 92; Yang, 1979: 205, fig. 2; Chen & Cheng, 1982: 143, fig. 1 (NMF 1); Chen & Yu, 1986: 112; Hsu & Joung, 2004: 184; Shen & Wu, 2011: 82, fig. *Centrophorus niaukang*: Chen & Joung 1993: pl. 2 (fig. 1).

Taiwan voucher material: (10 spec.) FRIP 03628 (2 spec.), juvenile male 637 mm TL, adult male 719 mm TL; NMMB-P uncatalogued, 736 mm TL, adult male, Da-xi; NMMB-P 14051, juvenile female 408 mm TL, Cheng-gong, 2 Oct 2011; NMMB-P 15813, female 905 mm TL, Cheng-gong, 2 Oct 2011; NMMB-P 15814 (tissue accession GN10190), adult male 745 mm TL, Cheng-gong, 18 Jul 2011; NMMB-P 15756 (tissue accession GN10189), adult male 720 mm TL, Cheng-gong, 30 Jul 2011; NMMB-P 15859, 761 mm TL, adult male, Cheng-gong, 29 Mar 2011; NMMB-P HO-353, NMMB-P HO-354, Da-xi, 14 Apr 2012.

Remarks: Caught relatively frequently but in low numbers from bycatch landings of deepwater fisheries in western and southern Taiwan. Preliminary taxonomic investigation of this species reveals it represents a species complex. A detailed taxonomic investigation of this complex is underway by WTW and DAE; it is likely the species name will change for the Taiwanese species.

Conservation status: Vulnerable.

***Centrophorus moluccensis* Bleeker, 1860**

Smallfin Gulper Shark / 皺皮刺鯊

Centrophorus moluccensis Bleeker, 1860a: 3. Holotype: RMNH 7415, late-term embryo 188 mm, Ambon, Indonesia.

Local synonymy: *Centrophorus moluccensis*: Chen & Joung, 1993: 37, pl. 1 (fig. 10); Nakabo, 2002: 152; Hsu & Joung, 2004: 184; Shen & Wu, 2011: 83, fig. *Centrophorus scalpratus*: Chen & Cheng, 1982: 143, fig. 4 (NMF 2); Chen & Yu, 1986: 112. *Centrophorus uyato*: Chen & Joung, 1993: 37, pl. 2, fig. 2; Shen & Wu, 2011: 83, fig.

Taiwan voucher material: (3 spec.) CSIRO H 7403-01 (tissue accession GN10171), female 587 mm TL, 22°32'N, 120°07'E, off Kaohsiung, 320 m depth, 21 Mar 2012; NMMB-P HO-166 (tissue accession GN10053), female 947 mm TL, Da-xi, 14 Mar 2012; DAE 881305, female 371 mm TL, Da-xi, 13 May 1988.

Remarks: Drawing of *C. scalpratus* in Chen & Cheng (1982), but specimen location not known. Caught relatively frequently but in low numbers from bycatch landings of deepwater fisheries in eastern, western and southern Taiwan. This species likely represents a species complex and a detailed taxonomic investigation is currently underway by two of us (WTW, DAE). Previously referred to as *Centrophorus scalpratus* McCulloch, 1915, described from southeastern Australia, and currently considered a junior synonym of *C. moluccensis*. Shen & Wu (2011: 83) has a picture of a juvenile *Centrophorus* species that he refers to as *C. uyato*, but it appears to be a juvenile *C. moluccensis*.

Conservation status: Data Deficient.

***Centrophorus squamosus* (Bonnaterre, 1788)**

Leafscale Gulper Shark / 葉鱗刺鯊

Squalus squamosus Bonnaterre, 1788: 12. Holotype: MNHN A-7829 (head only); no locality stated (probably eastern North Atlantic).

Local synonymy: *Centrophorus squamosus*: Hsu & Joung, 2004: 185, fig. 2.

Taiwan voucher material: (12 spec.) ASIZP 60842, female 350 mm TL, Da-xi ; DAE 882904, 740 mm TL, adolescent male, Da-xi, 29 April 1988; CAS 234957, juvenile male 374 mm TL, Da-xi, 21 May 2005; CSIRO H 5611-12, 425 mm TL, juvenile female, CSIRO H 5611-13, juvenile male 436 mm TL, Da-xi, 1 Aug 2000; CSIRO H 6292-14, juvenile female 407 mm TL, Da-xi, 21 May 2005; AMNH 258167 (tissue accession GN10049), female 404 mm TL, CSIRO H 7395-01 (tissue accession GN10050), juvenile male 374 mm TL, CSIRO H 7395-02, juvenile female 392 mm TL, juvenile female, HUMZ 213795, juvenile male 427 mm TL, Da-xi, 14 Mar 2012; NMMB-P HO-349, NMMB-P HO-351, Da-xi, 5 May 2012.

Remarks: Caught relatively frequently but in low numbers from bycatch landings of deepwater fisheries in western and southern Taiwan. Small juveniles are common in the bycatch of bottom trawl fisheries and can be easily misidentified with juveniles of *C. granulosus*; the denticles differ between small juveniles of *C. squamosus* and *C. granulosus*, with the former having much larger denticles raised on tall, narrow pedicels (vs. denticles smaller and on low, broad pedicels). Occurs in deeper water than other *Centrophorus* species, one of us (DAE, unpubl. data) examined a specimen in April 1988 landed at the Da-xi, but only recently has this species been reported from Taiwan waters (Hsu & Joung, 2004). Its increased presence at fish markets in recent years may be indicative of fisheries extending into deeper waters than were traditionally fished.

Conservation status: Vulnerable.

Genus *Deania* Jordon & Snyder, 1902

Birdbeaked Dogsharks / 田氏鯊屬

Deania Jordan & Snyder, 1902: 80. Type species: *Deania eglantina* Jordan & Snyder, 1902, by monotypy, a junior synonym of *Acanthidium calceum* Lowe, 1839.

Deania cf. *calcea*

Taiwan Birdbeak Dogfish / 喙吻田氏鯊

Local synonymy: *Deania eglantina*: Teng, 1962: 145, fig. 37; Chen, 1963: 85 (TFRI 103281, 845 mm TL); Shen, 1984a: 65, fig.; Chen & Yu, 1986: 112. *Deania rostrata*: Matsubara, 1936b: 113, fig. 82; Teng, 1958: 23, fig.; Teng, 1962: 23, fig. 15. *Deania aciculata*: Shen & Ting, 1972: 14, fig. 1a–d. *Deania calcea*: Chen & Joung, 1993: 38, pl. 2.5; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 83, fig.

Taiwan voucher material: (2 spec.) CAS 235383, juvenile male, 382 mm TL, Da-xi, 22 May 2005; UF 148936, female, 762 mm TL, Da-xi, 23 May 2005.

Remarks: This is one of at least two *Deania* species known to occur in Taiwan waters, but the taxonomy of this genus and any associated species in Taiwanese waters requires further research to confirm its identity. Sho Tanaka (Tokai University, pers. comm.) is currently revising this genus. Also, see additional remarks below under *D. cf. profundorum* account.

Conservation status: Least Concern.

Deania cf. *profundorum*

Taiwan Longsnout Dogfish / 四棘田氏鯊

Local synonymy: *Deania eglantina*: Teng 1958: 23, fig. 15; Teng, 1962: 145, fig. 37. *Deania rostrata*: Teng, 1962: 23, fig. 15. *Deania aciculata*: Shen, 1984a: 66, fig.; Chen & Yu, 1986: 112.

Taiwan voucher material: (11 spec.) DAE 880905, female, Da-xi, May 1988; CSIRO H 6292-16, juvenile male 330 mm TL, CSIRO H 6292-17, female 800 mm TL, CAS 235384, female 349 mm TL, CAS 235385, juvenile male 342 mm TL, Da-xi, 21 May 2005; UF 159696, juvenile male 258 mm TL, Da-xi, 25 May 2005; AMNH 258168 (tissue accession GN10076), adult male 625 mm TL, Da-xi, 16 Mar 2012; MNHN 2013-0395 (tissue accession GN10077), juvenile male 282 mm TL, 22°26' N, 120°30' E, Dong-gang, 16 Mar 2012; NMMB-P HO-225 (tissue accession GN10112), female 860 mm TL, NMMB-P HO-226, female 865 mm TL, 22°26'N, 120°30'E, Dong-gang, 20 March 2012; CSIRO H 7399-01, adult male 635 mm TL, Changbin, Taitung, 18 Mar 2012.

Remarks: The taxonomic status of *Deania* species in Taiwanese waters is problematic. Various names, *D. aciculata*, *D. eglantina*, and *D. rostrata*, have been used, but an associated image has not always been provided to confirm which species is being referred to. Shen (1984a) provides an illustration of two *Deania* species, *D. eglantina* (= *D. cf. calcea*) and *D. aciculate* (= *D. cf. profundorum*), but recent accounts (Chen & Joung, 1993; Shen & Wu, 2011) includes *D. calcea* as the only confirmed species to occur in Taiwanese waters. Surveys conducted in April–May 1988 (DAE), May 2005 (DAE, WTW), and in March 2012 (present authors) confirm the occurrence of a second species, *D. cf. profundorum*, in Taiwan. The status of various nominal *Deania* species is under investigation by Sho Tanaka (pers. comm.).

Conservation status: Near Threatened.

Family Etmopteridae Fowler, 1934

Lanternsharks / 烏鯊科

Genus *Centroscyllium* Müller & Henle 1841

Combtooth Dogfish / 霞鯊屬

Centroscyllium Müller & Henle, 1841: 191. Type species: *Spinax fabricii* Reinhardt, 1825, by monotypy.

Centroscyllium kamoharai Abe, 1966

Bareskin Dogfish / 浦原氏霞鯊

Centroscyllium kamoharai Abe, 1966: 190, figs 1–8. Holotype: ZUMT 52310, 440 mm TL adult female, Suruga Bay, off Yaizu, Japan.

Local synonymy: Centroscyllium kamoharai: Hsu & Joung, 2004: 186, fig. 3; Shao et al., 2008: 237; Shen & Wu, 2011: 84, fig.

Taiwan voucher material: (16 spec.) ASIZP 62451, 460 mm TL, Da-xi, 8 Apr 2003; ASIZP 62478, 458 mm TL, ASIZP 62479, 440 mm TL, Da-xi, 6 Jul 2002; ASIZP 64245 (2 spec.), 212–215 mm TL, ASIZP 64252, 217 mm TL, northeastern Taiwan, 992 m depth, 23 Jul 2004; ASIZP 64271, 141 mm TL, northeastern Taiwan, 764 m depth, 22 Jul 2004; ASIZP 66081, 165 mm TL, South China Sea, 954 m depth, 19 Aug 2005; ASIZP 66103, 290 mm TL, ASIZP 66113, 440 mm TL, South China Sea, 1098 m, 19 Aug 2005; ASIZP 66907, 186 mm TL, South China Sea, 987 m depth, 8 Mar 2006; ASIZP 66933 (2 spec.), 314–390 mm TL, South China Sea, 996 m depth, 8 Mar 2006; EBFS 02020901, female, 458 mm TL, Da-xi, Jan 2004; CSIRO H 6294-18, female, 457 mm TL, UF 159199, female 512 mm TL, Da-xi, 23 May 2005; CAS 214727, Da-xi, 19 Jul 2001.

Remarks: Hsu & Joung (2004) first reported this species based on a specimen collected at the Da-xi. The appearance of this species in fish markets over the past decade indicates that fishing efforts are now moving into deeper water off Taiwan.

Conservation status: Data Deficient.

Genus *Etmopterus* Rafinesque, 1810

Lanternsharks / 烏鯊屬

Etmopterus Rafinesque, 1810a: 14. Type species: *Etmopterus aculeatus* Rafinesque, 1810a, by monotypy.

Etmopterus brachyurus Smith & Radcliffe in Smith, 1912.

Shorttail lanternshark / 短尾烏鯊

Etmopterus brachyurus Smith & Radcliffe in Smith, 1912: 679, fig. 2, pl. 52. Holotype: USNM 70257, 227+ mm adult male, Albatross Sta. 5550, off Jolo Light, Jolo Island, Philippine Islands, 6°02'00" N, 120°44'40" E, 481 m depth.

Local synonymy: Etmopterus lucifer: Teng, 1959d: 73, fig.; Teng, 1962: 163, fig. 41; Chen, 1963: 84, fig. 26; Shen & Ting, 1972: 15, fig. 2b; Shen, 1984a: 65, fig.; Chen & Joung, 1993: 39, pl. 2.6; Shao et al., 2008: 237 (name only); Shen & Wu, 2011: 84, fig. Etmopterus mollerii: Joung & Chen, 1992: 22, fig. 5; Etmopterus brachyurus: Schaaf da Silva & Ebert, 2006: 61, fig. 5; Shao et al., 2008: 237; Shen & Wu, 2011: 84, fig.

Taiwan voucher material: (7 spec.) MNHN 2013-0409 (tissue accession GN10137), female 344 mm TL, HUMZ 213806 (tissue accession GN10141), female 353 mm TL, CSIRO H 7401-03 (tissue accession GN10142), female 250 mm TL, 22°26'N, 120°30'E, Dong-gang, 19 Mar 2012; CSIRO H 7402-01 (tissue accession GN10156), female 355 mm TL, HUMZ 213807 (tissue accession GN10157), female 228 mm TL, NMMB-P HO-271 (tissue accession GN10158), juvenile male 186 mm TL, HUMZ 213808 (tissue accession GN10159), female 157 mm TL, 22°26'N, 120°30'E, Dong-gang, 20 Mar 2012. See Schaaf-Da Silva & Ebert (2006) for list of additional examined.

Remarks: *Etmopterus brachyurus* has frequently been misidentified as *E. lucifer* in Taiwanese waters, but most figures of *E. lucifer* are actually of *E. brachyurus*, a common *Etmopterus* species that is frequently taken as bycatch in local bottom trawl fisheries.

Conservation status: Data Deficient.

***Etmopterus burgessi* Schaaf-DaSilva & Ebert, 2006**

Broadnose lanternshark / 柏氏烏鯊

Etmopterus burgessi Schaaf-DaSilva & Ebert, 2006: 53–64: 53, fig. 1, tab. 1. Holotype: CAS 223476, 355 mm TL, adult male, Ta-Shi fish market, Taiwan, 24°53'N, 122°01'E, collected by D.A. Ebert, 11 May 1988.

Local synonymy: *Etmopterus mollerii*: Chen & Joung, 1993: 39, pl. 2.7. *Etmopterus burgessi*: Schaaf-DaSilva & Ebert, 2006: 53, fig. 1. *Etmopterus lucifer*: Shen & Wu, 2011: 84, ill.

Taiwan voucher material: (9 spec.) CSIRO H 7395-36 (tissue accession GN10017), adult male 343 mm TL, CSIRO H 7395-37 (tissue accession GN10018), juvenile male 245 mm TL, CSIRO H 7395-38 (tissue accession GN10019), female 207 mm TL, CSIRO H 7395-39 (tissue accession GN10020), juvenile male 214 mm TL, CSIRO H 7395-40 (tissue accession GN10021), female 216 mm TL, Da-xi, 15 Mar 2012; NMMB-P HO-289, juvenile male 355 mm TL, NMMB-P HO-290, female 227 mm TL, NMMB-P HO-291, juvenile male 166 mm TL, NMMB-P HO-292, juvenile male 196 mm TL, 22°32'N, 120°07'E, off Kaohsiung, 320 m depth, 15 Mar 2012. See Schaaf-DaSilva & Ebert (2006) for additional specimens.

Remarks: *Etmopterus burgessi* is not as common and appears to occur at greater depths than *E. brachyurus*; this latter species appears to be most common in shallower depths relative to other Taiwanese etmopterids.

Conservation status: Data Deficient.

***Etmopterus joungi* Knuckey, Ebert & Burgess, 2011**

Shortfin Smooth Lanternshark / 莊氏烏鯊

Etmopterus joungi Knuckey, Ebert & Burgess, 2011: 61, fig. 1, tab. 1. Holotype: CAS 227957, 456 mm TL (435 mm TL after preservation), juvenile female, Da-xi fish market, Taiwan, 24° 53'N, 122° 01'E, collected by D.A. Ebert, 23 May 2005.

Local synonymy: *Etmopterus pusillus*: Chen & Yu, 1986: 112; Chen & Joung, 1993: 39, pl. 2.8 (possibly a different species); Shao *et al.* 2008: 237 (name only); Shen & Wu, 2011: 85, fig. *Etmopterus joungi*: Knuckey *et al.*, 2011: 61, fig. 1.

Taiwan voucher material: NMMB-P HO-253 (tissue accession GN10140), juvenile male 195 mm TL, Dong-gang, 19 Mar 2012; CSIRO H 7399-03 (tissue accession GN10145), female 386 mm TL, CSIRO H 7399-04 (tissue accession GN10146), female 332 mm TL, HUMZ 213802 (tissue accession GN10144), female 465 mm TL,

HUMZ 213803 (tissue accession GN10147), female 301 mm TL, MNHN 2013-0410 (tissue accession GN10148), female 306 mm TL, Chang-bin, Taitung, 19 Mar 2012. See Kunckey *et al.* (2011) for additional specimens.

Remarks: Commonly collected from deep-water off eastern Taiwan. This recently described species is morphologically similar to and genetically indistinguishable from *E. pusillus*. DAE and NS are currently carrying out further research on this etmopterid subgroup.

Conservation status: Data Deficient.

Etmopterus cf. molleri

Taiwan Slendertail Lanternshark / 莫氏烏鯊

Local synonymy: *Etmopterus lucifer*: Teng, 1959d: 73, fig.; Teng, 1962: 163, fig. 41; Chen, 1963: 84, fig. 26; Chen, 1969: 65; Shen & Ting, 1972: 15, figs. 2a–j, tab. 1 (in part); Joung & Chen, 1992: 22, fig. 5. *Etmopterus pusillus*: Chen & Joung, 1993: 39, pl. 2.8; Shen & Wu, 2011: 84, fig.

Taiwan voucher material: (18 spec.) CAS 236053 (tissue accession GN10012), female 325 mm TL, CAS 236053 (tissue accession GN10013), female 322 mm TL, CSIRO H 7395-09 (tissue accession GN10014), female 226 mm TL, CAS 236053 (tissue accession GN10015), female 255 mm TL, HUMZ 213805 (tissue accession GN10016), juvenile male 150 mm TL, Da-xi, 14 Mar 2012; CAS 236054 (tissue accession GN10086), juvenile male 226 mm TL, CAS 236054 (tissue accession GN10087), juvenile male 178 mm TL CAS 236054 (tissue accession GN10088), juvenile male 161 mm TL, CAS 236054 (tissue accession GN10089), juvenile male 145 mm TL, Da-xi, 15 Mar 2012; CAS 236055 (tissue accession GN10138), 341 mm TL, female, 22°26'N, 120°30'E, Dong-gang, 19 Mar 2012; CAS 236056 (tissue accession GN10154), female 320 mm TL, CAS 236056 (tissue accession GN10155), adolescent male 275 mm TL, Dong-gang, 20 Mar 2012; CAS 236060 (tissue accession GN10167), female 297 mm TL, CAS 236060 (tissue accession GN10168), adult male 278 mm TL, CAS 236060 (tissue accession GN10169), adult male 277 mm TL, CAS 236060 (tissue accession GN10170), female 184 mm TL, CAS 236060 (tissue accession GN10174), female 312 mm TL, CAS 236060 (tissue accession GN10175), juvenile male 183 mm TL, Dong-gang, 21 Mar 2012.

Remarks: Yamakawa *et al.* (1986) synonymised western North Pacific specimens with *E. molleri* originally described from Australia based on morphological data. Genetic data reveal a distinct North Pacific clade, which will require re-examination of regional type specimens. The species is taken as bycatch in local fisheries.

Conservation status: Least Concern.

Etmopterus sheikoi (Dolganov, 1986)

Rasptooth Dogfish / 長吻烏鯊

Centroscyllium sheikoi Dolganov, 1986: 151, fig. 1E. Holotype: ZIL 46199 425 mm male, presumably adult, Kyushu-Palau Ridge, near Japan, 26°47'N, 135°21'W, 360 m depth.

Local synonymy: New record for Taiwan waters.

Taiwan voucher material: (5 spec.) UF 159284 (tissue accession GN7385), adult male 428 mm TL, Da-xi, 22 May 2005; CAS 235388, adult male 432 mm TL, Da-xi, 21 May 2005; NMMB-P 15375, 210 mm TL, Nan-fang-ao, 26 Oct 2010; NMMB-P HO-410 (tissue accession GN12278), Da-xi, 14 Oct 2012; NMMB-P HO-411 (tissue accession GN12279), Da-xi, 6 Dec 2012.

Remarks: The generic rank of this species is based on molecular analyses which reveals this species clusters within *Etmopterus* (Straube *et al.*, 2010). The generic placement of this species is currently under investigation by NS.

Conservation status: Data Deficient.

***Etmopterus splendidus* Yano, 1988**

Splendid Lanternshark / 斯普蘭汀烏鯊

Etmopterus splendidus Yano, 1988: 422, fig. 1–2. Holotype: NSMT-P 50273, 247 mm TL juvenile female, 31°46.0'N, 129°43.8'E, off Shimo-Koshiki Island, Japan, 210 m depth.

Local synonymy: *Etmopterus lucifer*: Shen & Ting, 1972: 15, figs. 2a, tab. 1 (in part). *Etmopterus splendidus*: Chen & Joung, 1993: 39, pl. 2.9; Schaaf-Da Silva & Ebert, 2006: 61, fig. 5; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 85, fig.

Taiwan voucher material: NMMB-P HO-121 (tissue accession GN10008), female 307 mm TL, Da-xi, 15 Mar 2012; MNHN 2013-0421 (tissue accession GN9955), juvenile male 194 mm TL, Da-xi, 13 Mar 2012; CSIRO H 7395-10 (tissue accession GN10009), female 179 mm TL, CSIRO H 7395-11 (tissue accession GN10010), female 178 mm TL, CSIRO H 7395-42 (5 spec.), 116–136 mm TL, HUMZ 213804 (tissue accession GN10011), female 128 mm TL, Da-xi, 14 Mar 2012; MNHN 2013-0422 (20 spec.), 191–200 mm TL, Dong-gang, 18 Mar 2012; AMNH 258170 (tissue accession GN10139), juvenile male 286 mm TL, Dong-gang, 19 Mar 2012. Also, see Schaaf-Da Silva & Ebert (2006) for list of additional examined.

Remarks: A common species taken as bycatch in bottom trawl fisheries around Taiwan.

Conservation status: Data Deficient.

Genus *Trigonognathus* Mochizuki & Ohe, 1990

Viper Dogfishes / 尖頷烏鯊屬

Trigonognathus Mochizuki & Ohe, 1990: 385. Type species: *Trigonognathus kabeyai* Mochizuki & Ohe, 1990, by monotypy.

***Trigonognathus kabeyai* Mochizuki & Ohe, 1990**

Viper Dogfish / 卡氏尖頷烏鯊

Trigonognathus kabeyai Mochizuki & Ohe, 1990: 385, fig. 1–5. Holotype: FUMT-P 21151, juvenile male 216 mm TL, 33°23.40'N, 135°45.33'E, off Shionomisaki, Wakayama Prefecture, Japan, 330 m depth.

Local synonymy: *Trigonognathus kabeyai*: New record for Taiwan.

Taiwan voucher material: (6 spec.) ASIZP 72392 (3 spec.), 111–175 mm TL, Isaacs Kitt Midwater trawl, 3 Feb 2006; NMMB-P 14111, 108 mm TL, Dong-gang, 19 May 2011; NMMB-P uncatalogued (tissue accession GN12280), 382 mm TL, 22°26'N, 120°30'E, Dong-gang, 09 Nov 2012.

Remarks: This is the first record of this rare species from Taiwanese waters.

Conservation status: Data Deficient.

Family Somniosidae Jordan, 1888

Sleeper Sharks / 睡鯊屬

Genus *Somniosus* Lesueur, 1818

Sleeper Sharks / 睡鯊屬

Somniosus Lesueur, 1818: 222. Type species: *Somniosus brevipinna*, Lesueur, 1818 by monotypy; synonym of *Somniosus microcephalus* (Bloch & Schneider, 1801).

Somniosus pacificus Bigelow & Schroeder, 1944

Pacific Sleeper Shark / 太平洋睡鯊

Somniosus pacificus Bigelow & Schroeder, 1944: 35. Holotype: MCZ 1103-S (piece of skin and part of jaw), juvenile male, 191 cm (75") TL, Sagami Sea, Japan. Holotype is based on the specimen described and illustrated as *brevipinna* by Garman, 1913: 240, pl. 15, fig. 1–3.

Local synonymy: *Somniosus pacificus*: Wang & Yang, 2004: 229, fig. 2.

Taiwan voucher material: (2 spec.) NMMB-P 15786 (tissue accession GN10248), Cheng-gong, Taitung, 23 Dec 2010; NMMB-P 15714 (tissue accession GN10249), Cheng-gong, Taitung, 2 Oct 2011.

Remarks: A rare bycatch by local deep-sea fisheries.

Conservation status: Data Deficient.

Genus *Zameus* Jordan & Fowler 1903

Velvet Dogfishes / 鱗睡鯊屬

Zameus Jordan & Fowler, 1903: 632. Type species: *Centrophorus squamulosus* Günther, 1877, type by original designation, also monotypic.

Zameus ichiharai (Yano & Tanaka, 1984)

Japanese Velvet Dogfish / 一原氏鱗睡鯊

Scymnodon ichiharai Yano & Tanaka, 1984: 383, figs. 2, 3a, 4–6. Holotype: NSMT-P 21723, adult male 1011 mm TL, off Okitsu in Suruga Bay, 35°02'N, 138°34.6'E, 580 m depth, 16 Mar 1982.

Local synonymy: New record for Taiwan.

Taiwan voucher material: (9 spec.) NMMB-P 15764 (tissue accession GN10224), NMMB-P 15765 (tissue accession GN10223), female 1305 mm TL, Cheng-gong, Taitung, 30 Jul 2011; NMMB-P 15841 (tissue accession GN10228), NMMB-P 15842 (tissue accession GN10230), adult female 1345 mm TL, NMMB-P 15843 (tissue accession GN10225), juvenile female 1340 mm TL, NMMB-P 15844 (tissue accession GN10229), adolescent female 1510 mm TL, NMMB-P 15845 (tissue accession GN10227), juvenile male 987 mm TL, NMMB-P 15846 (tissue accession GN10226), NMMB-P 15847 (tissue accession GN10231), Cheng-gong, Taitung, 2 Oct 2011.

Remarks: This species is reported here for the first time from outside Japanese waters and for the first time from Taiwanese waters. Recent catches of this and other deepwater species indicates that fisheries are fishing in deeper waters.

Conservation status: Data Deficient.

***Zameus squamulosus* (Günther, 1877)**

Velvet dogfish / 鱗睡鯊

Centrophorus squamulosus Günther, 1877: 433. Holotype: BMNH 1880.5.1.1, female 670 mm TL, *Challenger* station 232, off Inosima, Japan, 35°11'N, 139°28'E, BT - 41.4°F, 631 m depth.

Local synonymy: *Zameus squamulosus*: Hsu & Joung, 2004: 183, fig. 4.

Taiwan voucher material: (9 spec.) EBFS 02021001, female 301 mm TL, Da-xi (specimen reported in Hsu & Joung, 2004); ASIZP 60843, Da-xi, 30 Mar 2001; ASIZP 62476, 310 mm TL, Da-xi, 15 Feb 2002; ASIZP 62477, 300 mm TL, Da-xi, 9 Mar 2002; ASIZP 62457, 262 mm TL, Da-xi, 8 Apr 2003; CSIRO H 6293-20, female 276 mm TL, CAS 235392, female 308 mm TL, Da-xi, 22 May 2005; CAS 235393, juvenile female 264 mm TL, UF 159701, juvenile female 261 mm TL, Da-xi, 26 May 2005.

Remarks: Hsu & Joung (2004) reported the first record of this species from Taiwan. It is taken as bycatch in local deep-sea fisheries.

Conservation status: Data Deficient.

Family Dalatiidae Gray, 1851

Kitefin Sharks / 鎧鯊科

Genus *Dalatias* Rafinesque, 1810

Kitefin Sharks / 鎧鯊屬

Dalatias Rafinesque, 1810a: 10. Type species; *Dalatias sparophagus* Rafinesque, 1810a, type by subsequent designation.

***Dalatias licha* (Bonnaterre, 1788)**

Kitefin Shark / 鎧鯊

Squalus licha Bonnaterre, 1788: 12. Holotype: Lost, from "Le cap Bretan".

Local synonymy: *Dalatias licha*: Teng, 1958: 27, fig. 17; Teng, 1962: 167, fig. 42; Chen, 1963: 95; Shen, 1984a: 67, fig.; Chen & Yu, 1986: 113; Chen & Joung, 1993: 38, pl. 2.4; Shao *et al.*, 2008: 237; Ho & Shao, 2011: 19; Shen & Wu, 2011: 86, fig. *Dalatias tachiensis*: Shen & Ting, 1972: 18, figs. 3a–f; Chen & Yu, 1986: 113; Shen, 1984a: 67, fig.

Taiwan voucher material: (11 spec.) NTUM 7234001 (holotype, *D. tachiensis*), juvenile male 480 mm TL, 24°56.5' N, 121°53.0' E, 3000 m off coast of Da-xi, north-eastern Taiwan, 200–240 m depth; ASIZP 58674, 406 mm TL, Da-xi, 15 Sep 1997; ASIZP 60559, 413 mm TL, Da-xi, 10 Feb 1997; ASIZP 62455, 419 mm TL, Da-xi, 8 Apr 2003; ASIZP 63278, ASIZP 64621, 1000 mm SL, Da-xi, 22 Feb 2003; CSIRO H 6292-09, juvenile male 414 mm TL, Da-xi, 21 May 2005; FRIP 0340 (2 spec.), 345–365 mm TL, Dong-gang, 4 Oct 1957; UF 159698, juvenile female 366 mm TL, Da-xi, 25 May 2005; NMMB-P 15468, Da-xi, 23 Oct 2011.

Remarks: Shen & Ting (1972) described *D. tachiensis* based on a neonate of *D. licha*. One of us (DAE, April 1988) examined the holotype of *D. tachiensis* and confirmed that it is a junior synonym of *D. licha*. This species is very common at fish markets around Taiwan, especially Da-xi, where deep-sea fisheries occur.

Conservation status: Near Threatened.

Genus *Isistius* Gill, 1865

Cookiecutter Sharks / 雪茄鮫屬

Isistius Gill 1865: 264. Type species: *Scymnus brasiliensis* Quoy & Gaimard, 1824, type by monotypy.

***Isistius brasiliensis* (Quoy & Gaimard, 1824)**

Cookiecutter Shark / 巴西達摩鯊

Scymnus brasiliensis Cuvier, in Quoy & Gaimard, 1824: 198. Holotype: MNHN A-7787, 140 mm TL female, off Brazil.

Local synonymy: *Isistius brasiliensis*: Joung *et al.*, 1989: 240, fig. 3; Chen & Joung, 1993: 40, pl. 2.10; Shen & Wu, 2011: 86, fig.

Taiwan voucher material: (4 spec.) NMF 0504, male 350 mm TL, Nan-fang-ao, Oct 1987; ASIZP 59802, Da-xi, 13 Oct 1998; FRIP 0573 (2 spec.), 307–423 mm TL, Keelung, 28 Jun 1989; FRIP 20508, 430 mm TL, Cheng-gong, Taitung, 10 Nov 1993.

Remarks: Joung *et al.* (1989) reported the first record of this species from Taiwan waters, but no new specimens were collected during the current survey. DAE examined a specimen during a survey in April–May 1988. It appears to be relatively rare in Taiwanese waters.

Conservation status: Least Concern.

Genus *Squaliolus* Smith & Radcliffe in Smith, 1912

Pygmy sharks / 擬角鯊屬

Squaliolus Smith & Radcliffe in Smith, 1912: 684. Type species: *Squaliolus laticaudus* Smith & Radcliffe, 1912, type by original designation.

***Squaliolus aliae* Teng, 1959**

Smalleye Pygmy Shark / 阿里擬角鯊

Squaliolus alii Teng, 1959c: 1, pl. 1. Holotype: TFRI 3837, female 187 mm TL, off Tung-Kang, Taiwan, ~330 m depth. Name corrected to *aliae* by Sasaki & Uyeno (1987) because this species was named after the describer's wife.

Local synonymy: *Squaliolus alii*: Teng, 1959c: 1, pl. 1; Teng, 1962: 171, fig. 43; Chen, 1963: 94; Chen & Yu, 1986: 113; Shen, 1984a: 67, fig.; Shao *et al.*, 2008: 237; Ho & Shao, 2011: 19; Shen & Wu, 2011: 86, fig. *Squaliolus laticaudus*: Chen & Joung, 1993: 40, pl. 3.1; Shen & Wu, 2011: 86, fig.

Taiwan voucher material: (76 spec.) TFRI 3837 (Holotype), female 187 mm TL, 22°26'N, 120°30'E, Dong-gang (examined by DAE April 1988); CSIRO H 6296-05 (12 spec.), 100–125 mm TL, CAS 235391, ~120 mm TL, UF 159376, ~120 mm TL, Da-xi, 25 May 2005; CSIRO H 6297-04 (15 spec.), 100–117 mm TL, Da-xi, 26 May 2005; MNHN 2013-0406 (tissue accession GN9911), female 227 mm TL, Da-xi, 14 Mar 2012; HUMZ 213798 (tissue accession GN10004), female 241 mm TL; HUMZ 213797 (tissue accession GN10005), adult male 202 mm TL, HUMZ 213796 (tissue accession GN10006), female 103 mm TL, HUMZ 213799 (tissue accession GN10007),

female 104 mm TL, Da-xi, 14 Mar 2012; CSIRO H 7397-01, female 215 mm TL, CSIRO H 7403-03, female 205 mm TL, Da-xi, 14 Mar 2012; MNHN 2013-0407 (18 spec.), 95–115 mm TL, 22°26'N, 120°30'E, Dong-gang, 18 Mar 2012; MNHN 2013-0408, female 225 mm TL, off Kaohsiung, 22°32'N, 120°07'E, 320 m depth, 21 Mar 2012. *Remarks:* This species was described by Teng (1959c), but subsequently synonymised by Seigel *et al.* (1977) and Seigel (1978). Sasaki & Uyeno (1987) revisited the issue and concluded that *S. aliae* was a valid species, separable from *S. laticaudus*. Most subsequent authors have considered *S. aliae* to be a valid species, although Shen & Wu (2011) lists both species as occurring in Taiwanese waters. *Squaliolus aliae* is not uncommon at landing grounds in Da-xi and Dong-gang, but to our knowledge *S. laticaudus* has not been confirmed from Taiwan.

Conservation status: Least Concern.

Order Pristiophoriformes

Family Pristiophoridae Bleeker, 1859

Sawsharks / 鋸齒鯊科

Genus *Pristiophorus* Müller & Henle, 1837

Sawsharks / 鋸齒鯊屬

Pristiophorus Müller & Henle, 1837a (2): 116. Also Müller & Henle, 1837b, (3): 399; Müller & Henle, 1838a (2): 89 ("*Pristis cirrhatus*, Latham" designated as type species); Müller & Henle, 1838b (6): 65; Müller & Henle, 1839 (2): 97. Type species: *Pristis cirratus* Latham, 1794, by monotypy.

Pristiophorus japonicus Günther, 1870

Japanese Sawshark / 日本鋸齒鯊

Pristiophorus japonicus Günther, 1870: 433. Syntypes (4): BMNH 1862.11.1.37 (1), Japan, BMNH 1953.8.10.6 (1 in poor condition), and BMNH uncat. (2 stuffed spec., not found) according to Eschmeyer (2013).

Local synonymy: *Pristiophorus japonicus*: Nakamura, 1936: 43; Chen, 1948: 93; Teng, 1962: 179; Chen, 1963: 102; Shen, 1984a: 67; Chen & Yu, 1986: 115; Shao *et al.*, 2008: 237; Ebert & Wilms, 2013: this volume.

Taiwan voucher material: ASIZP 57267 (2 spec.), male 582 mm TL, female 356 mm TL, Dongsha Islands, Taiwan, 19°85'N, 114°03'E, 15 May 1993. TFRI uncat., 1030 mm TL (examined by DAE).

Remarks: First reported from Taiwanese waters by Nakamura (1936), and more recently by Shao *et al.* (2008), this species does not appear to be very common at fish markets around Taiwan, at least in recent years. Since *P. japonicus* appears to be a more temperate water, coastal species, its occurrence in Taiwan, the southern edge of its range, suggests that it may never have been a very abundant a species in these waters. One of us (DAE) examined an unregistered 1030 mm TL specimen in the TFRI collection at Keelung in May 1988, this may have been the specimen referred to by Chen (1963: 102), but this could not be validated. Also, ASIZP 57267 was examined by DAE (November, 2012) and are referenced in Ebert & Wilms (2013, this volume).

Conservation status: Data Deficient.

Order Squatiniformes

Family Squatinidae Bonaparte, 1838

Angel Sharks / 扁鯊科

Genus *Squatina* Duméril, 1806

Angel Sharks / 扁鯊屬

Squatina Duméril, 1806: 102, 342. Type species: *Squalas squatina* Linnaeus 1758, by subsequent designation.

***Squatina formosa* Shen & Ting, 1972**

Taiwan Angel Shark / 台灣扁鯊

Squatina formosa Shen & Ting, 1972: 21, fig. 4. Holotype: NTUM 01329 (formerly NTT 7213130), 337 mm. TL juvenile male, 20°28.0'N, 120°26.3'E, S.W. Taiwan, 183 m.

Local synonymy: *Squatina formosa*: Shen & Ting, 1972: 21, fig. 4; Shen, 1984a: 68, fig.; Chen & Yu, 1986: 116; Chen & Joung, 1993: 42; Walsh & Ebert, 2007: 31, fig. 2, tabs. 1–2; Shao *et al.*, 2008: 237; Ho & Shao, 2011: 19; Walsh *et al.*, 2011: 49, figs. 3–5, tab. 2. Shen & Wu, 2011: 88, fig.

Taiwan voucher material: Holotype: NTUM 01329 (formerly NTT 7213130), juvenile female, 22°26' N, 120°30' E, Dong-gang, 31 Jan 1972. Other specimens (3): DAE 881805, juvenile male 321 mm TL, Da-xi, 18 May 1988; CAS 235394, juvenile male 387 mm TL, Da-xi, 21 May 2005; CAS 235396, juvenile female 682 mm TL, Da-xi, 23 May 2005.

Remarks: Walsh & Ebert (2007) re-examined and reviewed the members of this genus from Taiwanese waters and determined that the holotype was indeed valid, but that the paratypes (n = 3) were all of a different species, *S. nebulosa*. The original description of *S. formosa* by Shen & Ting (1972) was based on a combination of both species, thus causing confusion in separating these two morphologically similar species. Also, the type series had been relabeled with two different specimens being listed as the holotype. See Walsh & Ebert (2007) for a redescription and detailed discussion of this species.

Conservation status: Endangered.

***Squatina japonica* Bleeker, 1858**

Japanese Angel Shark / 日本扁鯊

Squatina japonica Bleeker, 1858: 40. Holotype: RMNH 7416, juvenile male, 525 mm TL, Nagasaki, Japan.

Local synonymy: *Squatina japonica*: Kuroda, 1951: 316; Chen, 1963: 100; Shen, 1984a: 68, fig.; Chen & Yu, 1986: 116; Chen & Joung, 1993: 42, pl. 3.6; Walsh & Ebert, 2007: 31, fig. 4, tab. 1; Walsh *et al.*, 2011: 55, figs. 3; Shen & Wu, 2011: 88, fig.

Taiwan voucher material: No specimen examined in this study.

Remarks: The only specimens of this species examined for this study were at a fish market in Keelung in April–May 1988 (DAE, pers. obs.). This species does not appear to be as common as *S. formosa* and *S. nebulosa* in Taiwanese waters.

Conservation status: Vulnerable.

***Squatina nebulosa* Regan, 1906**
Clouded Angel Shark / 雲紋扁鯊

Squatina nebulosa Regan, 1906: 439. Holotype: BMNH 1862.11.1.89, juvenile female, 580 mm. TL specimen, Japan.

Local synonymy: Squatina nebulosa: Teng, 1962: 180, fig. 45; Chen, 1963: 101; Shen, 1984a: 68, fig.; Chen & Yu, 1986: 116; Chen & Joung, 1993: 42, pl. 3.7; Walsh & Ebert, 2007: 31, fig. 5, tab. 1–2; Shao *et al.*, 2008: 237; Walsh *et al.*, 2011: 49, figs. 3–5, tab. 2; Shen & Wu, 1022:88, fig.

Taiwan voucher material: (8 spec.) Catalogued as paratypes of *S. formosa*, but reidentified as *S. nebulosa* in Walsh & Ebert (2007): NTUM 01327 (formerly NTU 7222433 and NTU 7041632), caught 3 km off the coast of Da-xi (24°56.5'N, 121°53.0'E) in 100–120 fathoms, 16 Apr 1970; NTUM 01328 (formerly NTU 7041632), juvenile female, Da-xi, 24 Feb 1972; DAE 882105, juvenile female 399 mm TL, Da-xi, 21 May 1988; CAS 235395, juvenile male 402 mm TL, Da-xi, 23 May 2005; DAE 052505, juvenile male 610 mm TL, Da-xi, 25 May 2005; AMNH 258172 (tissue accession GN10161), juvenile female 405 mm TL, CSIRO H 7402-05 (tissue accession GN10160), juvenile male 512 mm TL, Dong-gang, 20 Mar 2012; MNHN 2013-0506 (tissue accession GN10126), juvenile male 396 mm TL, Dong-gang, 19 Mar 2012.

Remarks: *Squatina nebulosa* is morphologically very similar to *S. formosa*, with both species being the two most common angel shark species found at Taiwan fish markets, especially on the east coast. Misidentification of this species in the original description of *S. formosa* has led to confusion in separating these two species. The type series of *S. formosa* includes three paratypes, all of these appear referable to *S. nebulosa* (see Walsh & Ebert, 2007 for discussion of this issue).

Conservation status: Vulnerable.

***Squatina tergocellatoides* Chen, 1963**
Ocellated Angel Shark / 擬背斑扁鯊

Squatina tergocellatoides Chen, 1963: 98, fig. 28. Holotype: THUP 00348, juvenile female 625 mm TL, Taiwan Strait.

Local synonymy: Squatina tergocellatoides: Chen, 1963: 98, fig. 28; Shen, 1984a: 68, fig.; Chen & Yu, 1986: 116; Chen & Joung, 1993: 42; Walsh & Ebert, 2007: 31, fig. 6; Walsh *et al.*, 2011: 49, figs. 3; Shen & Wu, 2011: 88, fig.

Taiwan voucher material: (1 specimen) THUP 348, female, 625 mm SL, Taiwan Strait.

Remarks: Walsh & Ebert (2007; fig. 6) figured a photograph of this species taken at a fish market in Keelung. The holotype of this species had been reported as lost, but during the present survey one of us (HH) found the primary type for this species. Theiss & Ebert (2013) provide a redescription of the holotype.

Conservation status: Vulnerable.

Order Heterodontiformes

Family Heterodontidae Gray, 1851 Bullhead Sharks / 異齒鯊科

Genus *Heterodontus* Blainville, 1816 Bullhead Sharks / 異齒鯊屬

Heterodontus Blainville, 1816: 121. Type species: “*Philippi?*” = *Squalus philippi* Bloch & Schneider, 1801, by monotypy, a junior synonym of *Squalus portus jacksoni* Meyer, 1793.

***Heterodontus japonicus* Miklouho-Maclay & Macleay, 1884**

Japanese Bullhead Shark / 日本異齒鯊

Heterodontus japonicus Miklouho-Maclay & Macleay, 1884: 428, pl. 20. Holotype: AMS B. 68, female from Tokyo, Japan.

Local synonymy: Heterodontus japonicus: Chen, 1948: 45; 1963: 7; Shen, 1984a: 49, fig.; Chen & Yu, 1986: 119; Chen & Joung, 1993: 44, pl. 3.8; Shen & Wu, 2011: 53, fig.;

Taiwan voucher material: No specimens of this species were examined during this study.

Remarks: Chen (1963) examined one small specimen at the Keelung Museum, but this specimen was subsequently lost. This species appears to be rare in Taiwanese waters.

Conservation status: Least Concern.

***Heterodontus zebra* (Gray, 1831)**

Zebra Bullhead Shark / 斑紋異齒鯊

Centracion zebra Gray, 1831: 5. Holotype: BMNH 1953.5.10.4, dry specimen, female ~470 mm TL, from Swatow, China. Also, *Cestracion zebra* Aggassiz, 1853: 65, possibly a correction of Gray’s generic allocation rather than a new name.

Local synonymy: Heterodontus zebra: Nakamura, 1936: 40; Chen, 1948: 45; 1963: 8, fig. 2; Liang, 1951: 4; Teng, 1962: 40, fig. 8; Shen, 1984b: 49, fig.; Chen & Yu, 1986: 119; Chen & Joung, 1993: 44, pl. 3.9; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 53, fig.

Taiwan voucher material: (6 spec.) NMMB-P 5040, female, Kaohsiung, 11 Oct 1965; NMMB-P 5041, female, Tainan, 16 Mar 1964; NMMB-P 6295, 2 females, Taichong, 1 May 1962; NMMB-P 8845 (2 spec.), female 220 mm TL, juvenile male 212 mm TL, Penghu, 30 Aug 2005; NMMB-P 15867, female 1005 mm TL.

Remarks: This appears to be the more common of the two *Heterodontus* species known from Taiwan. The species has been observed at fish markets in Keelung and on the southwestern part of the Island.

Conservation status: Least Concern.

Order Orectolobiformes

Family Parascyllidae Gill, 1862

Collared Carpetsharks / 斑鰭鯊科

Genus *Cirrhoscyllium* Smith & Radcliffe in Smith, 1913b

Saddled Carpetsharks / 喉鬚鯊屬

Cirrhoscyllium Smith & Radcliffe in Smith, 1913b: 568. Type species: *Cirrhoscyllium exolitum* Smith & Radcliffe in Smith, 1913b, by original designation.

***Cirrhoscyllium formosanum* Teng, 1959b**

Taiwan Saddled Carpetshark / 台灣喉鬚鯊

Cirrhoscyllium formosanum Teng, 1959b: 1, pl. 1. Holotype: TFRI 3574, female 367 mm TL, off Kaohsiung, Taiwan, 110 m depth.

Local synonymy: Cirrhoscyllium formosanum: Teng, 1959b: 1, pl. 1; 1962: 59, fig. 14; Chen, 1963: 18; Shen, 1984a: 52, fig.; Chen & Yu, 1986: 122; Chen & Joung, 1993:45; Goto & Nakaya, 1996: 199: fig. 3; Shao *et al.*, 2008: 236; Shen & Wu, 2011:55, fig.

Taiwan voucher material: (9 spec.) AMNH 258166 (tissue accession GN10120), adult female 391 mm TL, CSIRO H 7401-04, adult male 324 mm TL CSIRO H 7401-05, juvenile male 190 mm TL, CSIRO H 7401-06 (tissue accession GN10125), female, 195 mm TL, HUMZ 213816, pregnant female 386 mm TL, HUMZ 213817 (tissue accession GN10123), female 337 mm TL, MNHN 2013-0425 (tissue accession GN10121), adult male 343 mm TL, Dong-gang, 19 Mar 2012; MNHN 2013-0470 (tissue accession GN10162), adult male 360 mm TL, Dong-gang, 20 Mar 2012; CAS 236049, adult female 395 mm TL, off Kaohsiung, 22°32'N, 120°07'E, 320 m depth, 21 Mar 2012.

Remarks: This species was originally described from 12 specimens including the holotype and 11 paratypes (8 males and 3 females) ranging in length from 347 to 390 mm, all collected from Kaohsiung. As far as known this little shark is endemic to the southern coast of Taiwan.

Conservation status: Data Deficient.

Family Orectolobidae Gill, 1896

Wobbegongs / 鬚鯊科

Genus *Orectolobus* Bonaparte, 1834

Wobbegongs / 鬚鯊屬

Orectolobus Bonaparte, 1834: 39 (as subgenus of *Scyllium*). Type species: *Squalus barbatus* Gmelin, 1789, by subsequent designation.

***Orectolobus japonicus* Regan, 1906**

Japanese Wobbegong / 日本鬚鯊

Orectolobus japonicus Regan, 1906:435, figs. Syntypes: BMNH 1862.11.1.18 [or 17], 1862.11.1.90, 2 females, 1000 and 780 mm TL, Japan.

Local synonymy: Orectolobus maculatus (non Bonnaterre, 1788): Chen & Yu, 1986: 122; Chen & Joung, 1993:46, pl. 4.1; Shao *et al.*, 2008: 55; Shen & Wu, 2011: 55, fig.

Taiwan voucher material: No material examined during this study.

Remarks: Figure in Chen & Joung (1993) is clearly of *Orectolobus japonicus* although we have not confirmed the source locality of this image. A 1008 mm TL specimen referred to by Chen (1963) as *O. japonicus* from the South China Sea, based on its colour description, appears to be correctly identified. Widespread in the western North Pacific.

Conservation status: Data Deficient.

Orectolobus leptolineatus Last, Pogonoski & White, 2010

Indonesian Wobbegong / 細線鬚鯊

Orectolobus leptolineatus Last, Pogonoski & White, 2010:2, figs. Holotype: MZB 18623, adult male 887 mm TL, Kedonganan fish market, Bali, Indonesia.

Local synonymy: *Orectolobus japonicus* (non Regan, 1906): ?Shen, 1984a: 53; ?Chen & Yu, 1986: 122; Chen & Joung, 1993:46, pl. 3.10; Shao *et al.*, 1994: 276; Chen, 2004: 20; Shao *et al.*, 2008: 55; Shen & Wu, 2011: 55, fig.

Taiwan voucher material: AMS I. 43794-002, 1020 mm TL, Makung, Penghu, 26 May 2005, coll. P. Kyne.

Remarks: Images of unconfirmed location in Chen & Joung (1993) and Shao *et al.* (2008), and AMS I. 43794-002, are of a species provisionally identified as *Orectolobus japonicus*.

Conservation status: Not Evaluated.

Family Hemiscylliidae Gill, 1862

Bamboo Sharks / 長尾鯊科

Genus *Chiloscyllium* Müller & Henle, 1837a

Bamboo Sharks / 狗鯊屬

Chiloscyllium Müller & Henle, 1837a: 112. Type species: *Scyllium plagiosum* (Anonymous [Bennett], 1830, by subsequent monotypy).

Chiloscyllium plagiosum (Anonymous [Bennett], 1830)

Whitespotted Bamboo Shark / 斑竹狗鯊

Scyllium plagiosum Anonymous [Bennett], 1830: 694. Holotype probably lost. Neotype: CAS 36046, adult male 503 mm TL, Java Sea, Indonesia, 5°58' S, 106°48' E; neotype designation by Dingerkus & DeFino (1983).

Local synonymy: *Chiloscyllium indicum* var. *plagiosa*: Günther, 1870: 412; Jordan & Evermann, 1902: 317, fig. 1; Jordan & Fowler, 1903: 604, fig. 2; Jordan *et al.*, 1913: 9 (China, Formosa, Japan); Nakamura, 1936: 16, pl. 6, fig. 1 (Keelung); Matsubara, 1936b: 51, fig. 36 (Japan, Taiwan); Chen, 1948: 26; Shen, 1984a: 33, fig.: Chen, 2004: 20. *Chiloscyllium plagiosum*: Regan, 1908: 362 (580 mm specimen, Formosa); Fowler, 1930: 487 (Formosa); Chen, 1956: 14; Teng, 1962: 69; Chen, 1963: 23 (THUP 1828); Dingerkus & DeFino, 1983: 24 (BMNH 1862.12.6.66, 2 spec., 125–250 mm, “Formosa”; CAS 15845, 3 spec.), 337–375 mm, Formosa Banks); Shen, 1984a: 33, fig.; Chen & Yu, 1986: 122; Chen & Joung *et al.*, 1993: 47, pl. 4 (fig. 3); Shao *et al.*, 1993: 122; ; Chen, 2004: 20; Chen *et al.*, 2007: 92; Chen *et al.*, 2008: 1245; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 56, figs. *Chiloscyllium colax*: Matsubara, 1955: 110 (Japan, Taiwan, China); Chen, 1956: 14; Teng, 1962: 70, fig. 18; Chen, 1963: 23, fig. 7; Liu *et al.*, 1985: 88, fig.; Chen & Yu, 1986: 122. *Hemiscyllium colax*: Fowler, 1941: 89 (Red Sea to Taiwan). *Hemiscyllium plagiosum*: Fowler, 1941: 86 (China, Formosa).

Taiwan voucher material: (6 spec.) CAS uncatalogued (TAI-158), juvenile male 511 mm TL, CSIRO H 6295-20, juvenile male 495 mm TL, UF 159314, female 404 mm TL, Da-xi, 24 May 2005; AMNH 258165, juvenile male 313 mm TL, Da-xi, 15 Mar 2012; MNHN 2013-0462 (tissue accession GN10099), female 542 mm TL, CAS 236048 (tissue accession GN10100), juvenile male 443 mm TL, Dong-gang, Mar 2012.

Remarks: The most abundantly caught shark in coastal fisheries in northern and western Taiwan; catch statistics not available as not sold through the regular market system (Chen *et al.*, 2007). Records of *Chiloscyllium indicum* from Taiwan appear to refer to this species; historically was referred to as *C. colax* in Taiwan.

Conservation status: Near Threatened.

***Chiloscyllium punctatum* Müller & Henle, 1838c**

Brownbanded Bamboo Shark / 點紋狗鯊

Chiloscyllium punctatum Müller & Henle, 1838c: 18, pl. 3. Neotype: AMNH 38153, female 352 mm TL, off Jakarta, Java Sea, Indonesia, 23 Mar 1940.

Local synonymy: *Chiloscyllium punctatum*: Nakamura, 1936: 15, pl. 5, fig. 2; Chen, 1948: 27; Chen, 1956: 14; Teng, 1962: 68, fig. 17; Chen, 1963: 21, fig. 6 (THUP 1970); Shen, 1984a: 33, fig.; Chen & Yu, 1986: 122; Chen & Joung, 1993: 47, pl. 4 (fig. 4); Chen, 2004: 20; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 56, fig. *Hemiscyllium punctatum*: Fowler, 1941:85.

Taiwan voucher material: (4 spec.) HUMZ 213818 (tissue accession GN10102), juvenile male 492 mm TL, HUMZ 213819 (tissue accession GN10103), juvenile male 528 mm TL, MNHN 2013-0463 (tissue accession GN10101), female 542 mm TL, CAS 236048 (tissue accession GN10104), female 572 mm TL, 22°26'N, 120°30'E, Dong-gang, Mar 2012.

Remarks: Commonly caught by coastal fisheries in Taiwan, but apparently not as abundant as *C. plagiosum*. Historical records of *C. griseum* from Taiwan are likely misidentifications of this species. A recent molecular study has shown this species probably belongs to a species complex (Naylor *et al.*, 2012); taxonomic investigation is required to confirm the nomenclature of the western North Pacific populations.

Conservation status: Near Threatened.

Family *Ginglymostomatidae* Gill, 1862

Nurse Sharks / 鮫口鯊科

Genus *Nebrius* Rüppell, 1837

Tawny Nurse Sharks / 光鱗鯊屬

Nebrius Rüppell, 1837: 62. Type species: *Nebrius concolor*, Rüppell, 1837, by monotypy.

***Nebrius ferrugineus* (Lesson, 1831)**

Tawny Nurse Shark / 鏽鬚鯊 / 護士鯊

Scyllium ferrugineum Lesson, 1831: 95. Holotype: specimen with body 1015 cm TL and tail 355 mm mentioned, possibly not saved. Type locality: Port Praslin, New Ireland and Baie d'Offack, Waigeo, New Guinea.

Local synonymy: *Ginglymostoma ferrugineum*: Teng, 1958: 6, fig. 4; 1962: 63, fig. 15; Chen, 1963: 18; Shen, 1984a: 52, fig.; Chen & Yu, 1986: 122. *Nebrius ferrugineus*: Chen & Joung, 1993: 48, pl. 4.6; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 57, fig.

Taiwan voucher material: No specimens were examined during the present survey.

Remarks: The first record of this species reported by Teng (1958) based on a 2480 mm TL specimen from Keelung. Specimens used for aquarium exhibitions were collected by set nets from around Taiwan.

Conservation status: Vulnerable.

Family Stegostomatidae Gill, 1862

Zebra Sharks / 虎鯊科

Genus *Stegostoma* Müller & Henle, 1837

Zebra Sharks / 虎鯊屬

Stegostoma Müller & Henle, 1837a: 112. Type species: *Squalus fasciatus* Bloch & Schneider, 1801, by original designation, equals *Squalus fasciatus* Hermann, 1783.

***Stegostoma fasciatum* (Hermann, 1783)**

Zebra Shark / 大尾虎鯊

Squalus fasciatum Hermann, 1783: 302. Based on *Squalus varius* Seba, 1758. A senior homonym of *Squalus fasciatus* Bonnaterre, 1788 = *Poroderma africanum* (Gmelin, 1789). No types known to exist. Also, *Squalus fasciatus* Bloch, 1785: 19, pl. 113. Holotype: ZMB 4449, 355 mm TL male, Indian Ocean from Tranquebar, according to Paepke & Schmidt (1988: 163).

Local synonymy: *Stegostoma tigrinum*: Günther, 1870: 409; Regan, 1908: 363; Jordan *et al.*, 1913: 10; Fowler, 1941:100, fig.7. *Stegostoma varium*: Nakamura, 1936: 14, pl. 5; Matsubara, 1936b: 48, figs., 34, 35; Chen, 1948: 25; 1951: 181 (list); 1956: 14. *Stegostoma fasciatum*: Fowler, 1941: 100, fig. 7; Teng, 1962: 65, fig. 16; Chen, 1963: 20, fig. 5 (THUP 778, female, 305 mm TL; THUP 1674, male, 390 mm TL; THUP 969, male, 1055 mm TL); Shen, 1984a: 52, fig.; Chen & Yu, 1986: 122; Chen & Joung, 1993: 47, pl. 4.5; Shen & Wu, 2011: 57, fig.;

Taiwan voucher material: (3 spec.) NMMB-P 15726; NMMB-P 1354, NMMB-P 1355 (2 spec.), Dong-gang (the latter two lots are the same specimens examined in Chen, 1963).

Remarks: Records of this species occurring in Taiwanese waters date back to Günther (1870) and Chen (1963) reported on several specimens from Dong-gang and Keelung that included both juveniles and adults, but to the best of our knowledge this species has not been observed at fish markets in Taiwan in recent years. Since this is primarily a coastal, tropical reef species, which may never have been very common locally, combined with the intense coastal fishing that has occurred over the past couple of decades it may no longer occur locally. A living specimen exhibited in the NMMA aquarium was collected from Taiwanese waters.

Conservation status: Vulnerable.

Family Rhincodontidae Müller & Henle, 1839

Whale Shark / 鯨鯊科

Genus *Rhincodon* Smith, 1829

Whale Shark / 鯨鯊屬

Rhincodon Smith, 1829: 443. Type species: *Rhiniodon typus* Smith, 1828, by monotypy, as interpreted by the ICZN, 1984 (Opinion 1278).

***Rhincodon typus* (Smith, 1828)**

Whale Shark / 鯨鯊

Rhincodon typus Smith, 1828: 2. Holotype: MNHN 9855, male 4600 mm TL, stuffed and mounted, Table Bay, South Africa.

Local synonymy: *Rhincodon typus*: Teng, 1958: 7, fig. 5; 1962: 72, fig. 19; Chen, 1963: 16; Shen, 1984a: 51, fig.; Chen & Yu, 1986: 120; Chen & Joung, 1993: 48, pl. 4.7; Hsu *et al.*, 2007: 25; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 57, fig.; Hsu *et al.*, 2012: 1595.

Taiwan voucher material: Ten now born juveniles and one skin specimen (ca. 570 cm TL) deposited at NMMB-P.

Remarks: This species is well known in Taiwanese waters; for a review of the history of the fishery see Hsu *et al.* (2012) and the references therein. *Rhincodon typus* was a relatively low valued fish species in Taiwanese waters, with an annual average catch of 250–272 individuals, but these numbers declined from about the mid-1980s to less than 10 individuals by 1995.

Conservation status: Vulnerable.

Order Lamniformes

Family Mitsukurinidae Jordan, 1898

Goblin Sharks / 尖吻鯊科

Genus *Mitsukurina* Jordan, 1898

Goblin Sharks / 尖吻鯊屬

Mitsukurina Jordan, 1898: 199. Type species: *Mitsukurina owstoni* Jordan, 1898, by monotypy.

***Mitsukurina owstoni* Jordan, 1898**

Goblin shark / 歐氏尖吻鯊

Mitsukurina owstoni Jordan, 1898: 200, pls. 11–12. Holotype: ZMUT, uncat., 1070 mm juvenile male, near Yokohama, Japan, in deep water [lost].

Local synonymy: *Mitsukurina owstoni*: Lee & Shao, 2009: 306, fig. 2; Shen & Wu, 2011: 59, fig.

Taiwan voucher material: (3 spec.) ASIZP 70657, juvenile female 1280 mm TL, 6 Jul 2002; ASIZP 65068, juvenile female 1110 mm TL, 8 Jul 2005; NMMB-P HO-350, Da-xi, 6 May 2012.

Remarks: Two of us (DAE, WTW) observed and photographed a specimen at Da-xi in May 2005 that was estimated to be 1300 mm TL. Despite its general rarity, in April 2003 a gill-net fishing vessel landed 14 specimens off the coast of Su-ao over a three day period in water less than 400–500 m deep. The TL of most of these specimens ranged from 150–200 cm (Lee & Shao, 2009), although some are up to 300 cm (Hsu, H.-H., pers. comm.).

Conservation status: Least Concern.

Family Odontaspidae Müller & Henle, 1839

Sandtiger Sharks / 錐齒鯊科

Genus *Carcharias* Rafinesque, 1810a

Sandtiger Sharks / 錐齒鯊屬

Carcharias Rafinesque, 1810a: 10. Type species: *Carcharias taurus* Rafinesque, 1810, by monotypy.

***Carcharias taurus* Rafinesque, 1810a**

Spotted Raggedtooth / 錐齒鯊

Carcharias taurus Rafinesque, 1810a: 10, pl. 14, fig. 1. Holotype unknown; type locality: Sicily, Mediterranean Sea.

Local synonymy: *Carcharias taurus*: Teng, 1958: 17, fig. 11 (1 specimen, 936 mm TL, not retained); 1962: 931, fig. 25; Chen, 1963: 43; Shen & Wu, 2011: 59, fig. *Odontaspis taurus*: Shen, 1984a: 53, fig.; Chen & Yu, 1986: 127. *Eugomphodus taurus*: Chen & Joung, 1993: 49, pl. 4.8.

Taiwan voucher material: No specimen examined in this study.

Remarks: This species appears to be in Taiwanese waters. One of us (DAE) examined a 2 m TL specimen (7 April 1988) in the collection at National Ocean University, Keelung, that was incorrectly labelled as *Echinorhinus cookei*; no other information was available other than it was supposedly landed in the Keelung fish market.

Conservation status: Vulnerable.

Genus *Odontaspis* Agassiz, 1838

Deep-sea Sand Tiger Sharks / 砂錐齒鯊屬

Odontaspis Agassiz, 1838: 86, 87. Type confirmed by ICZN, on Official List (Opinion 723). Type species: *Carcharias ferox* Risso, 1827, by monotypy, equals *Squalus ferox* Risso, 1810. This genus takes precedence over *Carcharias* Rafinesque, 1810a when the two are considered synonyms, by special endorsement in Opinion 1469.3 (ICZN, 1987).

***Odontaspis ferox* (Risso, 1810)**

Smalltooth Sandtiger Shark / 兇猛砂錐齒鯊

Squalus ferox Risso, 1810: 38. Holotype unknown; type locality off Nice, France, in the Mediterranean Sea.

Local synonymy: *Odontaspis ferox*: Hsu et al. (this volume)

Taiwan voucher material: (2 spec.) EBFS 020203010201-1, adult female >3000 mm TL, Da-xi, Apr 2004; EBFS 020203010201-2, neonate female 1009 mm TL, Da-xi, Jun 2004.

Remarks: Hsu et al. (this volume) reported on the first two confirmed records of this species that were landed in 2004 at the Da-xi .

Conservation status: Vulnerable.

Family Pseudocarchariidae Compagno, 1973

Crocodile Sharks / 擬錐齒鯊科

Genus *Pseudocarcharias* Cadenat, 1963

Crocodile Sharks / 擬錐齒鯊屬

Pseudocarcharias Cadenat, 1963: 526 (proposed as a subgenus of *Carcharias* Rafinesque, 1810a, but used throughout in generic form). Type species: *Pseudocarcharias pelagicus* Cadenat, 1963, by original designation, a junior synonym of *Carcharias kamoharai* Matsubara, 1936a.

Pseudocarcharias kamoharai (Matsubara, 1936a)

Crocodile shark / 浦原氏擬錐齒鯊

Pseudocarcharias kamoharai Matsubara, 1936a: 380. Holotype: FAKU 1823, male, 735 mm TL, Koti, Koti, Japan, apparently lost according to Compagno (2001).

Local synonymy: *Carcharias yangi*: Teng, 1959a: 1, fig. 1; Teng, 1962: 98, fig. 26; Chen, 1963: 44; Chen & Yu, 1986: 127. *Odontaspis yangi*: Shen, 1984a: 53, fig. *Pseudocarcharias kamoharai*: Chen & Joung, 1993: 50, pl. 4.9; Shen & Wu, 2011: 59, fig.; Ho & Shao, 2011: 17.

Taiwan voucher material: Holotype: *Carcharias yangi* (= *P. kamoharai*) Teng, 1959a: TFRI 2895, adult male 1000 mm TL, Su-ao. Other specimens (3): FRIP 22131, female 1060 mm TL, off Cheng-gong, Taitung (photo examined only); two additional recently collected specimens in NMMB-P collection (tissue accession HO20110526ts).

Remarks: This species appears to be taken on occasion in the offshore pelagic fishery off northeastern Taiwan.

Conservation status: Near Threatened.

Family Megachasmidae Taylor, Compagno & Struhsaker, 1983

Megamouth Shark / 巨口鯊科

Genus *Megachasma* Taylor, Compagno & Struhsaker, 1983

Megamouth Shark / 巨口鯊屬

Megachasma Taylor, Compagno & Struhsaker, 1983: 87, 96, figs. 1–15. Type species: *Megachasma pelagios* Taylor, Compagno & Struhsaker, 1983 by original designation (also monotypic).

Megachasma pelagios Taylor, Compagno & Struhsaker, 1983

Megamouth Shark / 巨口鯊

Megachasma pelagios Taylor, Compagno & Struhsaker, 1983: 87, 96, figs. 1–15. Holotype: BPBM 22730, adult male 4460 mm TL, off Oahu, Hawaiian Islands, 21°51'N, 157°46'W, about 42 km northeast of Kahuku Point, at 165 m depth in about about 4600 m deep.

Local synonymy: *Megachasma pelagios*: Lee & Shao, 2009: 303, fig. 1, 3–4, tabs. 1–2.

Taiwan voucher material: (2 spec.) ASIZP 71582, female 4870 mm TL, Hualien, 4 May 2005; NMMB-P 8950, female 4830 mm TL, Hualien, 5 May 2005.

Remarks: This species was first reported from Taiwanese waters by Lee & Shao (2009) based on nine records from fish markets along the east coast. Most specimens (n = 8) were taken off Hualien. Two specimens were deposited in museum collections, while the remaining specimens were sold at market for human consumption. During preparation of this paper a specimen was landed (April 2013) at the fish market in Hualien. One additional specimen (ca. 3.5 m TL) collected from off Hualien in May 2013 was purchased and kept in NMMB-P.

Conservation status: Data Deficient.

Family Alopiidae Bonaparte, 1838

Thresher Sharks / 狐鯊科

Genus *Alopias* Rafinesque, 1810a

Thresher Sharks / 狐鯊屬

Alopias Rafinesque, 1810a: 13. Type species: *Alopias macrourus* Rafinesque, 1810a, by monotypy, a junior synonym of *Squalus vulpinus* Bonnaterre, 1788: 9.

***Alopias pelagicus* Nakamura, 1935**

Thintail Thresher Shark / 淺海狐鯊

Alopias pelagicus Nakamura, 1935: 2, 3, pl. 1, fig. 2. Syntypes: Three large individuals mentioned and measured, these 2700, 2850 and 3300 mm TL, and a large female specimen illustrated but of uncertain size; also a fetus 965 mm (Nakamura, *ibid*, 5, pl. 3), probably referable to *Alopias vulpinus*; all from Su-Ao fish market, Taiwan. The whereabouts of these syntypes is unknown (Compagno, 2001).

Local synonymy: Nakamura, 1935: 3, pl. 1, fig. 2; 1936: 8, pl. 2, fig. 1; Chen, 1948: 30; 1956: 13; 1963: 41; Teng, 1962: 93; Shen, 1984a: 54; Chen & Yu, 1986: 126; Chen & Joung, 1993: 50; Shao *et al.*, 2008: 236; Ho & Shao, 2011: 17; Shen & Wu, 2011: 60, fig.

Taiwan voucher material: (1 specimen) NMMB-P HO-178 (tissue accession GN10065), adult male 3137 mm TL, Da-wu, Taitung, 16 Mar 2012.

Remarks: A common species in Taiwanese waters, especially off the northeastern coast.

Conservation status: Vulnerable.

***Alopias superciliosus* Lowe, 1841**

Bigeye Thresher Shark / 深海狐鯊

Alopias superciliosus Lowe, 1841: 39. Also Lowe, 1849: 18 (sometimes dated 1839). Holotype unknown (Compagno, 2001), type locality Madeira, Eastern Atlantic.

Local synonymy: *Alopias profundus*: Nakamura, 1935: 2, pl. 1, fig. 1; 1936: 9, pl. 2, fig. 2; Matsubara, 1936b: 59, fig. 42; Chen, 1948: 30; 1956: 13; 1963: 42; Teng, 1962: 93; Chen & Yu, 1986: 126. *Alopias superciliosus*: Shen, 1984a: 55; Chen & Joung, 1993: 50, pl. 5.1; Shao *et al.*, 2008: 236; Ho & Shao, 2011: 17; Shen & Wu, 2011: 60, fig.

Taiwan voucher material: Commonly seen at fish markets, but no specimens were examined during the present study.

Remarks: A common species in Taiwan, especially off the northeastern coast.

Conservation status: Vulnerable.

***Alopias vulpinus* (Bonnaterre, 1788)**

Thresher Shark / 狐鯊

Squalus vulpinus Bonnaterre, 1788: 9. Types unknown according to Compagno (2001), type locality: Mediterranean Sea.

Local synonymy: *Alopias vulpinus*: ?Fowler, 1930: 87; Chen, 1948: 29; 1956: 13; 1963: 40; Shen, 1984a: 55; Chen & Joung, 1993: 50, pl. 5.2; Chen & Yu, 1986:126; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 60, fig.

Taiwan voucher material: Chen (1963) lists 2 specimens from Kaohsiung, THUP 01969 and THUP 01970, both male embryos. Although no specimens were examined during the present survey, this is not an uncommon species at fish markets, especially in southern Taiwan.

Remarks: This species is not uncommon in Taiwanese waters, along with the other two *Alopias* species.

Conservation status: Vulnerable.

Family Cetorhinidae Gill, 1862

Basking Shark / 象鯊科

Genus *Cetorhinus* Blainville, 1816

Basking Shark / 象鯊屬

Cetorhinus Blainville, 1816: 121. Type species: not designated; Blainville included the species “*Gunneri*; *Peregrinus*; *Shavianus*; *Homianus*?” in *Cetorhinus* without further comment. Gill (1862) designated *Squalus maximus* “Linnaeus” (=Gmelin, 1789) as type of *Cetorhinus*, but this was not an included species. Jordan & Gilbert (1883) designated “*Cetorhinus gunneri* Blainv. = *S. maximus* L.” (a junior synonym of *Squalus maximus* Gunnerus, 1765) as type of *Cetorhinus*, which may be the earliest valid type designation. Eschmeyer (2012) cited Jordan & Evermann (1896) as a later, similar type designation.

***Cetorhinus maximus* (Gunnerus, 1765)**

Basking Shark / 象鯊

Squalus maximus Gunnerus, 1765: 33, pl. 2. Holotype, apparently none. Type locality: Trondhjem, Norway.

Local synonymy: *Cetorhinus maximus*: Teng, 1958: 13, fig. 9; 1962: 86, fig. 23; Chen, 1963: 38; Shen, 1984a: 54, fig.; Chen & Yu, 1986: 125; Chen & Joung, 1993: 51, pl. 5.3; Shen & Wu, 2011: 62, fig.

Taiwan voucher material: Teng (1958) reported a 2150 mm TL specimen from Keelung; no specimens were observed during the present survey.

Remarks: This species is considered uncommon in Taiwanese waters.

Conservation status: Vulnerable.

Family Lamnidae Müller & Henle, 1838c

Mackerel Sharks / 鼠鯊科

Genus *Carcharodon* Smith in Müller & Henle, 1838a

Great White Sharks / 大白鯊屬

Carcharodon Smith in Müller & Henle, 1838a: 37. Type species: *Squalus carcharias* Linnaeus, 1758, by subsequent monotypy through *Carcharias lamia* Rafinesque, 1810a.

***Carcharodon carcharias* (Linnaeus, 1758)**

Great White Shark / 大白鯊

Squalus carcharias Linnaeus, 1758: 235. Holotype unknown, type locality: "Europa".

Local synonymy: Carcharodon carcharias: Teng, 1958: 12, fig.8; 1962: 32, fig. 22; Chen, 1963: 36; Shen, 1984a: 54, fig.; Chen & Yu, 1986: 124; Chen & Joung, 1993: 51, pl. 5.4; Shen & Wu, 2011: 61, fig.

Taiwan voucher material: Teng (1958: fig. 8) first reported this species from Taiwanese waters based on a 2820 mm TL (possibly adult) male, and the species is seen infrequently at fish markets, including a pregnant female that was landed at Su-Ao in March 1988 (DAE, pers. obs.).

Remarks: Carcharodon carcharias appears infrequently in catches around Taiwan, most records appear off the east coast, including a few records of gravid females being landed at fish markets in Taiwan; this information combined with gravid females being reported from Okinawa suggests that these sharks may use this region as a birthing area (Uchida *et al.*, 1996).

Conservation status: Vulnerable.

Genus *Isurus* Rafinesque, 1810a

Mako Sharks / 鯖鯊屬

Isurus Rafinesque, 1810a: 12, pl. 13, fig. 1. Type species: *Isurus oxyrinchus* Rafinesque, 1810a, by monotypy.

***Isurus oxyrinchus* Rafinesque, 1810a**

Shortfin Mako / 尖吻鯖鯊

Isurus oxyrinchus Rafinesque, 1810a: 12, pl. 13, fig. 1. Also Rafinesque, 1810b: 45. Holotype unknown. Type locality: Sicily, Mediterranean Sea.

Local synonymy: Isurus glaucus: Nakamura, 1936: 11, pl. 3, fig. 1; Teng, 1962: 85; Chen, 1963: 35; Chen & Yu, 1986: 124. *Isuropsis glauca*: Chen, 1948: 40. *Isurus oxyrinchus*: Shen, 1984a: 54, fig.; Chen & Joung, 1993: 52, pl. 5.5; Shen & Wu, 2011: 61, fig.

Taiwan voucher material: First reported by Nakamura (1936) from Taiwanese waters, this species is frequently seen at fish markets.

Remarks: Relatively common at fish markets around Taiwan.

Conservation status: Vulnerable.

***Isurus paucus* Guitart, 1966**

Longfin Mako Shark / 長臂鯖鯊

Isurus paucus Guitart, 1966: 3, figs. 1, 2A, 3A, 3C. Syntypes: 2260 mm PCL adult female, 2030 mm PCL adult male, and 1955 mm PCL adult female, possibly in the Instituto de Biología or Instituto de Oceanología, Cuba, collected in the Caribbean near Cuba. No type known according to Compagno (2001).

Local synonymy: *Isurus paucus*: Joung et al., 1989: 244, fig. 6; Chen & Joung, 1993: 52, pl. 5.6; Shen & Wu, 2011: 62, fig.

Taiwan voucher material: (1 specimen) NMF 0446, adult male, 1900 mm TL, Nan-fang-ao, Jan 1986.

Remarks: Although not as common as *I. oxyrinchus*, this species is seen on occasion at fish markets, particularly along the east coast.

Conservation status: Vulnerable.

Genus *Lamna* Cuvier, 1816

Porbeagle Sharks / 鼠鯊

Genus *Lamna* Cuvier, 1816: 126. Type species : *Squalus cornubicus* Bloch & Schneider, 1801 by monotypy, equals *S. cornubicus* Gmelin, 1789: 1497, and a junior synonym of *S. nasus* Bonnaterre, 1788.

***Lamna ditropis* Hubbs & Follet, 1947**

Salmon Shark / 太平洋鼠鯊

Lamna ditropis Hubbs and Follet, 1947: 194. Holotype: MCZ 36471, adult male (partial specimen, size uncertain). Type locality: La Jolla, California, 92 to 107 m off the La Jolla Beach Club in shallow water.

Local synonymy: New record for Taiwan.

Taiwan voucher material: Photograph of a juvenile specimen that was landed at Nan-fan-ao in September 2006, but precise location of capture and whether it was in Taiwanese waters is uncertain.

Remarks: A new record for Taiwanese waters of this species but requires further confirmation. This record is tentatively listed here.

Conservation status: Least Concern.

Order Carcharhiniformes

Family Scyliorhinidae Gill, 1862

Catsharks / 貓鯊科

Genus *Apristurus* Garman, 1913

Ghost Catsharks / 光尾鯊屬

Apristurus Garman, 1913: 96. Type Species: *Scylliorhinus indicus* Brauer, 1906, by original designation.

***Apristurus gibbosus* Meng, Chu & Li, 1985**

Humpback Catshark / 駝背籠鯊

Apristurus gibbosus Meng, Chu & Li, 1985: 43, 49, fig. 1. Holotype: SCSFRI D01121, female 410 mm TL, South China Sea, 913 m depth.

Local synonymy: *Apristurus gibbosus*: Nakaya and Kawauchi, 2013: 145.

Taiwan voucher material: (1 specimen) NMMB-P 17562, female 491 mm TL, Da-xi, 12 Nov 2012.

Remarks: This species, newly recorded by Nakaya and Kawauchi (2013), is distributed from the South China Sea northward to East China Sea (Okinawa Trough), and is not unexpected to occur around Taiwan, especially along the eastern coast.

Conservation status: Data Deficient.

***Apristurus herklotsi* (Fowler, 1934)**

Longfin Catshark / 長吻籠鯊

Pentanchus herklotsi Fowler, 1934: 238, fig. 3. Holotype: USNM 93134, juvenile female 312 (326) mm TL, *Albatross* Sta. D.5424, 9°37'05" N, 121°12'37" E, Cagayan Island, Jolo Sea, Philippine Islands.

Local synonymy: *Apristurus herklotsi*: Nakaya and Kawauchi, 2013: 131.

Taiwan voucher material: NMMB-P HO-198 (tissue accession GN10085), female 475 mm TL, Da-xi, 15 Mar 2012. Also see additional specimens listed in Nakaya and Kawauchi (2013).

Remarks: This species is commonly collected from Da-xi and Dong-gang, but most specimens were not identified correctly. Nakaya & Kawauchi (2013) reported this species for the first time from Taiwanese waters.

Conservation status: Data Deficient.

***Apristurus longicephalus* Nakaya, 1975**

Longhead Catshark / 長頭籠鯊

Apristurus longicephalus Nakaya, 1975: 32, figs. 15–16. Holotype: HUMZ 42399, juvenile male 375 mm TL, 33°13' N, 133°44' E, Tosa Bay, Kochi Pref., Japan.

Local synonymy: *Apristurus longicephalus*: Nakaya and Kawauchi, 2013: 138.

Taiwan voucher material: (1 specimen) ASIZP 64264, female 258 mm TL, 25°13.61'N, 122°49.5'E, 23 Jul 2004.

Remarks: This species is reported by Nakaya and Kawauchi (2013) for the first time from Taiwanese waters. It was not observed during a field survey in April–May 1988, but was observed by two of us (DAE, WTW) in May 2005 at the Da-xi. It does not appear to be as common as *A. herklotsi*.

Conservation status: Data Deficient.

***Apristurus macrostomus* Meng, Chu & Li, 1985**

Broadmouth Catshark / 大口籠鯊

Apristurus macrostomus Meng, Chu & Li, 1985: 45, 49, fig. 2. Holotype: SCSFRI D00807, male 380 mm TL, South China Sea, 913 m depth.

Local synonymy: Apristurus macrorhynchus: Chen, 1963: 33, fig. 11; Chen & Joung, in Shen, 1993: 53, pl.5.7. *Apristurus platyrhynchus*: Shen & Wu, 2011: 63, fig.

Taiwan voucher material: HUMZ 213825 (tissue accession GN10082), male 246 mm TL, HUMZ 213826 (tissue accession GN 10083), male 251 mm TL, HUMZ 213827, male 245 mm TL, Da-xi, 15 Mar 2012; CSIRO H 7394-15 (tissue accession GN9904), female 288 mm TL, CSIRO H 7394-16 (tissue accession GN9905), juvenile male 258 mm TL, HUMZ 213828, female 377 mm TL, HUMZ 213829 (tissue accession GN9903), female 354 mm TL, MNHN 2013-0492, female 311 mm TL, Da-xi, 13 Mar 2012; AMNH 258158, female 402 mm TL, CSIRO H 7395-44 (10 spec.), 180–325 mm TL, CSIRO H 7395-45, juvenile male 379 mm TL, CSIRO H 7395-46 (tissue accession GN9989), juvenile male 380 mm TL, CSIRO H 7395-47 (tissue accession GN9990), female 337 mm TL, CSIRO H 7395-48 (tissue accession GN9991), juvenile male 306 mm TL, CSIRO H 7395-49 (tissue accession GN9992), juvenile male 337 mm TL, CSIRO H 7395-50 (tissue accession GN9993), female 238 mm TL, CSIRO H 7395-51 (tissue accession GN9994), female 269 mm TL, MNHN 2013-0436 (tissue accession GN9987), female 311 mm TL, Da-xi, 14 Mar 2012; MNHN 2013-0435 (12 spec.), 167–420 mm TL, 22°26'N, 120°30'E, Dong-gang, 19 Mar 2012. Also see additional specimens listed in Nakaya and Kawauchi (2013).

Remarks: This is a most common species in *Apristurus* found in Taiwan. Most records of *A. platyrhynchus* are misidentification of present species.

Conservation status: Data Deficient.

***Apristurus platyrhynchus* (Tanaka, 1909)**

Spatulasnout Catshark / 扁吻籠鯊

Scyliorhinus platyrhynchus Tanaka, 1909: 4. Holotype: ZUMT 2154, male 800 mm TL, off Japan [lost].

Local synonymy: Apristurus platyrhynchus: Nakaya & Kawauchi, 2013: 161.

Taiwan voucher material: (1 specimen) ASIZP 66206, male 645 mm TL, South China Sea, 20°84'N, 117°45'E, 19 Aug 2005.

Remarks: Nakaya & Kawauchi (2013) reported this species for the first time from Taiwan. Appears to be very rare. This species has been sometimes erroneously reported from Taiwan, but those records were based on *A. macrostomus*, and not true *A. platyrhynchus*.

Conservation status: Data Deficient.

Genus *Atelomycterus* Garman, 1913

Coral Catsharks / 礁貓鯊屬

Atelomycterus Garman, 1913:100. Type Species: *Scyllium marmoratum* Bennett, 1830, by monotypy.

Atelomycterus marmoratus (Anonymous [Bennett], 1830)

Coral catshark / 斑貓鯊

Scyllium marmoratum Anonymous [Bennett], 1830: 693. Holotype: BMNH, a skin of a juvenile, possibly lost, according to Springer, 1979: 35, Sumatra.

Local synonymy: Atelomycterus marmoratus: Teng, 1958: 4, fig. 3; 1962: 53, fig. 13; Chen, 1963: 33; Shen, 1984a: 56, fig.; Chen & Yu, 1986: 129; Chen & Joung, 1993: 54; Shen & Wu, 2011: 63, fig.

Taiwan voucher material: FRIP 3593; NMMB-P 2266, O-luan-bi, Pingtung; NMMB-P 12662, 541 mm TL; NMMB-P 15349, 570 mm TL, Dong-gang, 8 Nov 2010.

Remarks: A common species sighted by the divers at coral reef areas around Taiwan, but rarely observed in fish markets.

Conservation status: Near Threatened.

Genus *Cephaloscyllium* Gill, 1862

Swellsharks / 頭鯊

Cephaloscyllium Gill, 1862: 408, 412. Type Species: *Scyllium laticeps* Duméril, 1853 by original designation.

***Cephaloscyllium fasciatum* Chan, 1966**

Reticulated Swellshark / 網紋頭鯊

Cephaloscyllium fasciatum Chan, 1966: 232, fig. 6, 7a,c, 8, pl. 3. Holotype: BMNH 1965.8.11.1, 422 mm TL, adolescent or adult female. Type locality: 15°55.7'N, 109°28.5'E, about 35 miles ESE of Cape Bantagan, Vietnam, 205 to 315 m depth.

Local synonymy: Cephaloscyllium maculatum: Schaaf-Da Silva & Ebert, 2008: 7, figs 6, 5b, 7b, 10b, tab. 1. *Cephaloscyllium pardelotum: Schaaf-Da Silva & Ebert*, 2008: 3, figs 1, 5a, 7a, tab. 1; Shen & Wu, 2011: 63, fig.

*Taiwan voucher material: CAS 224877, male 188 mm TL, Su-ao, 3 Apr 1988 (holotype of *C. maculatum*); CAS 224876, female 202 mm TL, Dong-gang, 21 Apr 1988 (holotype of *C. pardelotum*); See Nakaya *et al.* (2013, this issue) for information on additional specimens examined.*

Remarks: Common around southern Taiwan.

Conservation status: Data Deficient.

***Cephaloscyllium formosanum* Teng, 1962**

Taiwan Swellshark / 台灣頭鯊

Cephaloscyllium formosanum Teng, 1962: 48–51, fig. 11. Holotype: TFRI 4339, female 655 mm TL, collected off Tung-Kang, Taiwan, 22°25'N, 120°25'E, 7 Mar 1961.

Local synonymy: Cephaloscyllium formosanum: Teng, 1962: 48, fig. 11.

Taiwan voucher material: (1 specimen) TFRI 4339, female 655 mm TL, off Dong-gang, 22°25'N, 120°25'E, 7 Mar 1961 (holotype of *C. formosanum*).

Remarks: This species is known only by the solo holotype collected from Dong-gang. Shinsuke Inoue examined the holotype in 2002 and a search for the species by KN and HH was failed and the holotype is apparently lost (Nakaya *et al.*, 2013).

Conservation status: Not Evaluated.

***Cephaloscyllium sarawakensis* Yano, Ahmad & Gambang, 2005**

Sarawak Pygmy Swellshark / 沙勞越頭鯊

Cephaloscyllium sarawakensis Yano, Ahmad & Gambang in Yano *et al.*, 2005: 147, tabs 2–3, pls. 92–101. Holotype: IK-0002723 [also Museum catalogue number MSR201] (National Museum, Kuala Lumpur, Malaysia), adult female 354 mm TL, off Tanjung Sirik, Sarawak, Malaysia, 04°48'S, 109°56'E to 05°19'S, 111°16'E, 118–165 m depth, 2–11 Jul 1998.

Local synonymy: *Cephaloscyllium umbratile*: Teng, 1962: 45, fig. 10; Chen, 1963: 29, fig. 9. *Cephaloscyllium formosanum*: Shen, 1984b: 2, fig. 4–4. *Cephaloscyllium parvum*: Inoue & Nakaya, 2006: 77, figs. 1–3, 6a. *Cephaloscyllium sarawakensis*: Schaaf-Da Silva & Ebert, 2008: 25, figs 3, 5, 10, 16, tab. 3.

Taiwan voucher material: (26 spec.) CAS 224882, female 161 mm TL, Dong-gang, April 1988. See Nakaya *et al.* (2013) for information of additional specimens examined.

Remarks: This species is common at around southern Taiwan.

Conservation status: Data Deficient.

***Cephaloscyllium umbratile* Jordan & Fowler, 1903**

Japanese swellshark / 汗斑頭鯊

Cephaloscyllium umbratile Jordan and Fowler, 1903: 602, fig 1. Holotype: SU 12793, adult male 975 mm TL, collected from Nagasaki, Japan, 32°43'N, 129°50'E, stuffed skin.

Local synonymy: *Galeus eastmani*: Shen, 1984b: 2, fig. 4-2. *Cephaloscyllium isabellum*: Chen & Joung, 1993: 55, pl. 5.8; *Cephaloscyllium umbratile*: Schaaf-Da Silva & Ebert, 2008: 15, fig. 12, tab. 2; Shen & Wu, 2011: 64, fig.

Taiwan voucher material: (47 spec.) CSIRO H 5611-04, juvenile male 205 mm TL, CSIRO H 5611-08, juvenile male 300 mm TL, Da-xi, 1 Aug 2000; CSIRO H 6295-22, juvenile male 330 mm TL, Da-xi, 24 May 2005; HUMZ 213790 (tissue accession GN9907), male 798 mm TL, HUMZ 213791 (tissue accession GN9908), male 813 mm TL, MNHN 2013-0494 (tissue accession GN9909), female 805 mm TL, MNHN 2013-0495 (tissue accession GN9910), female 764 mm TL, Da-xi, 13 Mar 2012; MNHN 2013-0439 (tissue accession GN9985), female 196 mm TL, Da-xi, 14 Mar 2012; AMNH 258159 (tissue accession GN10061), juvenile male 329 mm TL, Nan-fang-ao, 14 Mar 2012. See Nakaya *et al.* (2013) for information of additional specimens examined.

Remarks: The holotype was reported by Springer (1979), Compagno (1984, 1988), and others to be lost, but was subsequently found during a move at the California Academy of Sciences, San Francisco, and redescribed by Schaaf-Da Silva and Ebert (2008). This species is very common around northern Taiwan.

Conservation status: Data Deficient.

Genus *Galeus* Rafinesque, 1810a

Sawtail Catsharks / 鋸尾鯊屬

Galeus Rafinesque, 1810a:13. Type Species: *Galeus melastomus* Rafinesque, 1810a, by subsequent designation of Fowler (1908: 53).

Galeus eastmani (Jordan & Snyder, 1904)

Gecko Catshark / 依氏蜥鯊

Pristiurus eastmani Jordan & Snyder, 1904: 230, pl. 60. Holotype: SU 7740, female 336 mm TL, Izu, Honshu, Japan.

Local synonymy: Galeus eastmani: Chen & Yu, 1986: 129; Chen & Joung, 1993: 55, pl. 5.9; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 64, fig.

Taiwan voucher material: (7 spec.) NMMB-P 12053, 3 females and 2 males, 192-340 mm TL, Nan-fang-ao, 11 Mar 2011; NMMB-P 12147, male 229 mm TL, Nan-fang-ao, 11 Mar 2011; NMMB-P 15372, female 340 mm TL, Nan-fang-ao, 26 Jul 2010.

Remarks: Commonly found in fishing landing groups of Nan-fang-ao at northeastern Taiwan and Dong-gang in southwestern Taiwan.

Conservation status: Least Concern.

Galeus nipponensis Nakaya, 1975

Broadfin Sawtail Catshark / 日本蜥鯊

Galeus nipponensis Nakaya, 1975: 51, figs. 26–28, 33f, 34c, 36–38f. Holotype: HUMZ 40012, adult female 596 mm TL, Mimase, Kochi Prefecture, Japan.

Local synonymy: Galeus sauteri: Shen & Wu, 2011: 64, (name only, figure is of a different species).

Taiwan voucher material: (8 spec.) NMMB-P 12053, 2 males, 300 and 358 mm TL, Nan-fang-ao, 3 Mar 2011; NMMB-P 13704, female 530 mm TL, 2 males, 410 and 570 mm TL, NMMB-P 13791, male 565 mm TL, 19 May 2011; NMMB-P 13792, male 516 mm TL, NMMB-P 13793, female 756 mm TL, Dong-gang, 19 May 2011; HUMZ 213822 (tissue accession GN10093), male 486 mm TL, Dong-gang, Feb 2012.

Remarks: New record for Taiwan. Rather common. Shen & Wu (2011: 64, fig.) figured a sawtailed catshark they referred to as *Galeus sauteri*, but the figure is actually that of *G. nipponensis*.

Conservation status: Data Deficient.

Galeus sauteri (Jordan & Richardson, 1909)

Blacktip Sawtail Catshark / 梭氏蜥鯊

Pristiurus sauteri Jordan & Richardson, 1909: 160, pl. 63, fig. 1. Holotype: The figured specimen is labeled type and evidently has been determined to be FMNH 55193 (ex CM 219). Paratypes: FMNH 55194 (1), SU 21261 (4). Compagno (1984) listed four syntypes, Stanford University, SU 21261, four adult males, 364, 367, 367, 370 mm TL, from Takao (Kaohsiung), Taiwan, of six mentioned by Jordan & Richardson.

Local synonymy: Pristurus sauteri: Jordan & Richardson, 1909: 160, fig. 1, pl. 63; Garman, 1913: 94; Nakamura, 1935: 18, fig. 1, pl. 7; Matsubara, 1936b: 40, fig. 23. Galeus sauteri: Fowler, 1941: 23; Teng, 1962: 43, fig. 9; Chen, 1963: 27, fig. 9; Yu, 1988: 6; Chen & Joung, 1993: 55, pl. 5.10; Shao et al., 2008: 237; Ho & Shao, 2011:18; Shen & Wu, 2011: 64, name only, the figure is that of a G. nipponensis. Apristurus macrorhynchus: Shen, 1984b: 3, fig. 4.6.

Taiwan voucher material: (15 spec.) AMNH 258160, adult male 369 mm TL, CSIRO H 7394-17 (tissue accession GN9889), female 400 mm TL, CSIRO H 7394-18 (tissue accession GN9890), female 412 mm TL, CSIRO H 7394-19 (tissue accession GN9891), adult male 387 mm TL, CSIRO H 7394-22 (tissue accession GN9957), adult male 390 mm TL, HUMZ 213823 (tissue accession GN9895), female 228 mm TL, HUMZ 213824 (tissue accession GN9897), female 241 mm TL, MNHN 2013-0498 (tissue accession GN9892), adult male 377 mm TL, MNHN 2013-0441(tissue accession GN9893), female 288 mm TL, MNHN 2013-0442 (tissue accession GN9894), female 230 mm TL, MNHN 2013-0443 (tissue accession GN9896), female 237 mm TL, CAS 236061 (tissue accession GN9898), juvenile male 250 mm TL, CAS 236061 (tissue accession GN9899), female 246 mm TL, CAS 236061 (tissue accession GN9900), juvenile male 212 mm TL, CAS 236061 (tissue accession GN9901), juvenile male 156 mm TL, Da-xi, 13 Mar 2012. Many additional specimens deposited in ASIZP and NMMB-P collections.

Remarks: Very common around Taiwan.

Conservation status: Data Deficient.

Genus *Halaelurus* Gill, 1862

Tiger Catsharks / 豹鯊屬

Halaelurus Gill, 1862: 407. Type Species: "*Halaelurus burgeri* Gill", by original designation.

***Halaelurus buergeri* (Müller & Henle, 1838c)**

Blackspotted Catshark / 伯氏豹鯊

Scyllium buergeri Müller & Henle, 1838c: 8, pl. 2. Lectotype: RMNH D2593, designated by Boeseman, 1947: 215.

Local synonymy: Scyllium bürgeri: Günther, 1870: 404; Haelurus bürgeri: Fowler, 1941: 44; Chen, 1948: 29; Teng, 1962: 51, fig. 12. Halaelurus bürgeri: Fowler, 1941: 44. Chen, 1963: 31, fig. 10. Halaelurus büergeri: Shen, 1984a: 56, fig. Halaelurus burgeri: Chen & Yu, 1986: 129; Chen & Joung, 1993: 55, pl. 6.1. Halaelurus buergeri: Shao et al., 2008: 236; Shen & Wu, 2011: 64, fig.

Taiwan voucher material: (6 spec.) FRIP 3592; NMMB-P 4197, Keelung, 1 Aug 1963; NMMB-P 4198, Tainan, 8 Jan 1963; NMMB-P 6216, Da-xi, 5 Aug 2003; NMMB-P 8844, Penghu Islands, 30 Aug 2005; NMMB-P 8862, Penghu Islands, 30 Aug 2005.

Remarks: Rather common.

Conservation status: Data Deficient.

Genus *Parmaturus* Garman, 1906

Filetail catsharks / 盾尾鯊屬

Parmaturus Garman, 1906: 203. Type Species: *Parmaturus pilosus* Garman, 1906. Type by subsequent designation. Type designated by Jordan, 1920: 518.

Parmaturus melanobranchus (Chan, 1966)

Blackgill Catshark / 黑鰓盾尾鯊

Dichichthys melanobranchus Chan, 1966: 226, figs. 2–3, pl. 1b. Holotype: BMNH 1965.8.11.6, juvenile female, 235 mm TL, South China Sea, about 135 miles SSE of Hong Kong, 20°05' N, 115°03' E, 300 fathoms depth, 22 Aug 1964.

Local synonymy: *Parmaturus melanobranchius*: Lee & Shao, 2010: 386, figs. 2–3, tab. 1.

Taiwan voucher material: (1 specimen) ASIZP 60963, juvenile male 148 mm TL, southern Taiwan Strait, 985–1110 m depth, 24 Nov 2001.

Remarks: Lee & Shao (2010) reported on the first record of this very rare deepwater catshark from Taiwan waters.

Conservation status: Data Deficient.

Parmaturus pilosus Garman, 1906

Salamander catshark / 盾尾鯊

Parmaturus pilosus Garman, 1906: 204. Holotype: MCZ 1107, juvenile male 544 mm TL, 34°59' N, 139°31' E, Sagami Bay, Japan, 786 m depth.

Local synonymy: *Parmaturus pilosus*: Hsu *et al.* (2013) report this species for the first time from Taiwan.

Taiwan voucher material: (2 spec.) EBFS 020204010602-1, adult female 588 mm TL, EBFS 020204010602-2, adult female 601 mm TL, Cheng-gong, Apr 2012.

Remarks: This new record for Taiwan is reported in detail in Hsu *et al.* (2013) in this special issue. Five specimens were caught, of which three were processed and sold at market, while two specimens were saved and deposited into the fish collection at National Taiwan Ocean University. Egg cases from one of the three specimens that were discarded are also deposited into the same fish collection.

Conservation status: Data Deficient.

Genus *Scyliorhinus* Blainville, 1816

Spotted Catsharks / 貓鯊屬

Scyliorhinus (subgenus of genus *Squalus* Linnaeus, 1758) Blainville, 1816:121. Type Species: "*Scyliorhinus canicula* Blainville", by subsequent designation of Gill (1862: 407).

Scyliorhinus tokubee Shirai, Hagiwara & Nakaya, 1992

Izu Catshark / 白點貓鯊

Scyliorhinus tokubee Shirai, Hagiwara and Nakaya, 1992: 9, fig. 1–3, tab. 1. Holotype: HUMZ 107358, adult male 413 mm TL, off Shirahama, Izu Peninsula, Shizuoka Pref, Japan, ~100 m depth, 23 Feb 1986.

Local synonymy: New record for Taiwan.

Taiwan voucher material: (2 spec.) ASIZP 57958, 164 mm TL, 182 mm TL, Nan-fang-ao, 1 Jul 1993.

Remarks: This rare coastal catshark is reported for the first time from Taiwanese waters.

Conservation status: Data Deficient.

Family Pseudotriakidae Gill, 1893

False Catsharks / 擬鰓唇鯊科

Genus *Pseudotriakis* de Brito Capello, 1868

False Catsharks / 擬鰓唇鯊屬

Pseudotriakis de Brito Capello, 1868: 321. Type species: *Pseudotriakis microdon* Capello, 1868, by monotypy.

***Pseudotriakis microdon* de Brito Capello, 1868**

False Catshark / 小齒擬鰓唇鯊

Pseudotriakis microdon de Brito Capello, 1868: 321, pl. 5, fig. 1. Holotype: MB uncatalogued, adult male 2310 mm TL, collected off Setubal, Portugal; lost in fire that destroyed this museum.

Local synonymy: *Pseudotriakis microdon*: Teng, 1958: 15, fig. 10; Chen & Joung, 1993: 57, pl. 6.4; Shen & Wu, 2011: 65, fig. *Pseudotriakis acrage*: Teng, 1962: 89, fig. 24; Chen, 1963: 39; Chen & Yu, 1986: 130. *Pseudotriakis acrales*: Shen, 1984a: 56, fig.

Taiwan voucher material: (9 spec.) NMMB-P 15787; NMMB-P 15838, NMMB-P 15839, 29 Mar 2011; NMMB-P 15707 (tissue accession GN10232), NMMB-P 15710 (tissue accession GN10233), 18 Jul 2011; NMMB-P 15708 (tissue accession GN10236), NMMB-P 15709 (tissue accession GN10237), NMMB-P 15712 (tissue accession GN10235), NMMB-P 15713, Cheng-gong, 2 Oct 2011.

Remarks: Although seen occasionally at fish markets, especially on the east coast, this species appears to be relatively uncommon. However, with increasing deep-sea fisheries off the east coast it may prove to be more common in this region than previously believed.

Conservation status: Data Deficient.

Family Proscylliidae Fowler, 1941

Finback Catsharks / 原鯊科

Genus *Eridacnis* Smith, 1913a

Ribbontail Catsharks / 光唇鯊屬

Eridacnis Smith, 1913a: 599. Type Species: *Eridacnis radcliffei* Smith, 1913a, by original designation.

***Eridacnis radcliffei* Smith, 1913a**

Pygmy Ribbontail Catshark / 雷氏光唇鯊

Eridacnis radcliffei Smith, 1913a: 599, figs. 1–3. Holotype: USNM 74604, 230 mm TL, pregnant female, 6°11.8'N, 121°08.3'E, off Jolo Light, Jolo Island, Sulu Archipelago, Philippine Islands, 295 m depth.

Local synonymy: Joung et al., 1989: 240, fig. 1; Chen & Joung, 1993: 56, pl. 6.2; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 65, fig.

Taiwan voucher material: (11 spec.) NMMB-P 2480, female 232 mm TL, Fong-gang, 200 m, 28 Feb 2001; NMMB-P 3504, female 233 mm TL, Kaohsiung, 25 Aug 2001; NMMB-P 8421, male 228 mm TL, Dong-gang, 17 Mar 2005; NMMB-P 12054 (3 spec.), 2 males 169 and 223 mm TL, female 222 mm TL, Nan-fang-ao, 11 Mar 2011; NMMB-P 13739, female 232 mm TL, Dong-gang, 20 Jul 2011; NMMB-P 14441, male 132 mm TL, Dong-gang, 28 Feb 2001; NMMB-P 14498, male 142 mm TL, Fong-gang, 28 Feb 2001; AMNH 258156 (tissue accession GN10091), adolescent male 221 mm TL, HUMZ 213821 (tissue accession GN10092), male 220 mm TL, 22°26' N, 120°30' E, Dong-gang, Feb 2012.

Remarks: Relatively common off southwestern Taiwan.

Conservation status: Data Deficient.

Genus *Proscyllium* Hilgendorf, 1904

Graceful Catsharks / 原鯊屬

Proscyllium (subgenus) Hilgendorf, 1904 (Genus *Scyllium* Cuvier, 1817): 39. Type Species: *Proscyllium habereri* Hilgendorf, 1904, by original designation under the usage formula "*Proscyllium habereri* nov. subgen., n. spec."

***Proscyllium habereri* Hilgendorf, 1904**

Graceful Catshark / 哈氏原鯊

Proscyllium habereri Hilgendorf, 1904: 39. Holotype: ZMB 16201, adult male 513 mm TL, from Takao, Formosa.

Local synonymy: *Halaelurus buergeri*: Shen, 1984b: 3, fig. 4–5; Chen & Yu, 1986: 132; Chen & Joung, 1993: 56, pl. 6.3; Shen & Wu, 2011: 64, fig. *Proscyllium habereri*: Fowler, 1941:65. *Proscyllium venustum*: Shen, 1984b: 3, fig. 5-1; Chen & Yu, 1986: 132; Shen & Wu, 2011: 65, fig.

Taiwan voucher material: (13 spec.) CAS uncatalogued (TAI-059), female 374 mm TL, Da-xi, 22 May 2005; TAI-002, adult male 449 mm TL, Da-xi, 18 May 2005; UF uncatalogued, juvenile male 337 mm TL, Da-xi, 23 May 2005; NMMB-P 6227, Da-xi, 29 Jun 2007; NMMB-P 7150, Dong-gang, 26 Dec 2003; AMNH 258157 (tissue accession GN10058), female 451 mm TL, HUMZ 213810 (tissue accession GN10059), male 322 mm TL, HUMZ 213811 (tissue accession GN10063), male 355 mm TL, MNHN 2013-0478 (tissue accession GN10057), female 596 mm TL, Nan-fang-ao, 14 Mar 2012; CSIRO H 7394-09 (tissue accession GN9958), female 605 mm TL, CSIRO H 7394-10 (tissue accession GN9959), juvenile male 315 mm TL, Da-xi, 13 Mar 2012; AMNH 258156 (tissue accession GN10091), adolescent male 221 mm TL, HUMZ 213821 (tissue accession GN10092), juvenile male 220 mm TL, 22°26'N, 120°30'E, Dong-gang, Feb 2012.

Remarks: A very common species, frequently seen at fish markets around Taiwan.

Conservation status: Data Deficient.

Family Triakidae Gray, 1851

Houndsharks / 皺唇鯊科

Genus *Hemitriakis* Herre, 1923

Tope Sharks / 半鰓唇鯊屬

Hemitriakis Herre, 1923: 70. Type species: *Hemitriakis leucoperiptera* Herre, 1923, by original designation.

Hemitriakis complicofasciata Takahashi & Nakaya, 2004

Ocellate Topeshark / 雜紋半鰓唇鯊

Hemitriakis complicofasciata Takahashi & Nakaya, 2004: 248, figs 1–6, 7a, 8a, 10a. Holotype: HUMZ 165226, male 796 mm TL, 24°40'N–25°30'N, 125°50'E–126°40'E, Okinawa Prefecture, Japan, 14 Aug 1999.

Local synonymy: *Hemitriakis complicofasciata*: Takahashi & Nakaya, 2004: 248.

Taiwan voucher material: NSYU uncat. embryo, male, 224mm TL, Dong-gang, Mar 1996 (Takahashi & Nakaya, 2004).

Remarks: Very similar in appearance to *H. japonica*, but differs in having embryos with a distinct complicated pattern of line and rings, more precaudal vertebrae, and a well developed (vs. rudimentary) nasal flap. Two additional specimens were sent to the Fishery Institute at Cheng-gong on 27 Apr 2012, the photos were examined by one of us (HCH).

Conservation status: Data Deficient.

Hemitriakis japonica (Müller & Henle, 1839)

Japanese Topeshark / 日本半鰓唇鯊

Galeus japonicus Müller & Henle, 1839: 58, pl. 22. Holotype: RMNH (dry)?

Local synonymy: *Galeorhinus japonicus*: Jordan & Evermann, 1902: 318; Fowler, 1941: 192; Chen, 1963, fig. 25 (THUP 1808); Yang, 1981: 2, fig. 1. *Galeus japonicus*: Jordan & Richardson, 1909: 162. *Eugaleus japonicus*: Nakamura, 1936: 35, pl. 15, fig. 2. *Galeorhinus japonicus*: Matsubara, 1955: 119; Chen, 1948: 33; Chen, 1956: 19; Teng, 1962: 110, fig. 29.; Yang & Chen, 1971: 1, fig. 1. *Hemitriakis japonica*: Compagno, 1970: 65; Compagno & Stevens, 1993: 197 (44 spec.); Shen, 1984a: 62, fig.; Shao *et al.*, 1993: 133; Chen & Joung, 1993: 57, pl. 6 (fig. 5); Chen, 2004: 21; Takahashi & Nakaya, 2004: 254 (24 spec.); Shao *et al.*, 2008: 236; White *et al.*, 2009: 41; Shen & Wu, 2011: 66, fig.

Taiwan voucher material: (17 spec.) CSIRO H 6294-30, female, 775 mm TL, Da-xi, 23 May 2005; CAS uncatalogued (TAI-170), juvenile male 569 mm TL, UF 159316, juvenile male 414 mm TL, Da-xi, 24 May 2005; NMMB-P 3227, Fu-gui-jiao, Taipei, 1 Jan. 2000; NMMB-P 4700, Penghu, 1 Aug 1957; NMMB-P 15128, Taichong, 20 Apr 1962; NMMB-P 6448, Taichong, 8 May 1962; NMMB-P 6491, Taichong, 16 Dec 1962; NMMB-P 6492, Taichong, 8 May 1961; NMMB-P 15800, 16 Feb 2011; NMMB-P 15851, NMMB-P 15854, 3 Mar 2011; AMNH 258161 (tissue accession GN9913), female 455 mm TL, CSIRO H 7394-20 (tissue accession GN9914), juvenile male 590 mm TL, HUMZ 213815 (tissue accession GN9912), female 873 mm TL, Da-xi, 13 Mar 2012; MNHN 2013-0510 (tissue accession GN10040), female 470 mm TL, Da-xi, 14 Mar 2012; CAS 236062 (tissue accession GN10062), female 707 mm TL, Nan-fang-ao, 14 Mar 2012.

Remarks: One of the most abundant sharks in coastal fisheries around Taiwan and an important food fish. Postnatal specimens superficially similar to *H. complicofasciata* thus some early records could possibly be of the latter species.

Conservation status: Least Concern.

Genus *Hypogaleus* Smith, 1957

Pencil Sharks / 下盤鯊屬

Hypogaleus Smith, 1957: 589. Subgenus of *Galeorhinus* Blainville, 1816. Type species: *Galeorhinus (Hypogaleus) zanzibariensis* Smith, 1957, by original designation (also monotypy); a junior synonym of *H. hyugaensis* Miyosi, 1939.

***Hypogaleus hyugaensis* (Miyosi, 1939)**

Pencil Shark / 下盤鯊

Eugaleus hyugaensis Miyosi, 1939: 91, fig. 1. Holotype: preserved at MGHSJ, female 904 mm TL; off Hyuga Nada, east coast of Miyazaki Prefecture, Japan; type location not known.

Local synonymy: *Galeorhinus hyugaensis*: Teng, 1962: 113, fig. 30; Chen, 1963: 82;. *Hypogaleus hyugaensis*: Shen, 1984a: 62, fig.; Chen & Joung, 1993: 57, pl. 6 (fig. 6); Nakabo, 2002: 134; Shen & Wu, 2011: 66, fig.

Taiwan voucher material: (2 spec.) FRIP 01272, (3 spec.), 655-1070 mm TL, Nan-fang-ao, 9 Dec. 1961; NMMB-P 6304, Keelung, 7 Jan 1963.

Remarks: Appears to be rare in Taiwanese waters.

Conservation status: Near Threatened.

Genus *Mustelus* Linck, 1790

Smoothhounds / 貂鯊屬

Mustelus Linck, 1790: 31. Type species: *Squalus mustelus* Linnaeus, 1758, by subsequent designation by the ICZN (Opinion 93: 1925:5).

***Mustelus griseus* Pietschmann, 1908**

Spotless Smoothhound / 灰貂鯊

Mustelus griseus Pietschmann, 1908: 132. Holotype: NMW 85501, Japan.

Local synonymy: *Galeorhinus kanekonis*: Nakamura, 1936: 39, pl. 16, fig. 1. *Mustelus griseus*: Wang & Chen, 1981: 25; Wang & Chen, 1982: 1; Shen, 1984a: 58, fig.; Chen & Yu, 1986: 132; Chen & Joung, 1993: 58, pl. 6 (fig. 7); Chen, 2004: 21; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 66, fig. *Mustelus kanekonis*: Chen, 1948: 31; Chen, 1956: 19; Teng, 1962: 103; Chen, 1963: 48, fig. 13 (THUP 0001); Chen & Yu, 1986: 132.

Taiwan voucher material: (15 spec.) NMMB-P 4698-1 (1 of 4 spec.), Penhu, 8 Jul 1967; NMMB-P 6435, Keelung, 11 Oct 1959; NMMB-P 6494, Dong-gang, 20 Apr 1962; NMMB-P 15771, 24 Apr 2011; CSIRO H 6294-29, 2 embryos 244 and 246 mm TL, Da-xi, 23 May 2005; CAS 235413, female 650 mm TL, CSIRO H 6295-17, adult male 675 mm TL, CSIRO H 6295-18, female 654 mm TL, CSIRO H 6295-19, female 685 mm TL, UF 159312, female 685 mm TL, Da-xi, 24 May 2005; CSIRO H 7397-03 (tissue accession GN10072), female 580 mm TL, Da-xi, 15 Mar 2012; CAS 236068 (tissue accession GN9888), male 656 mm TL, Wu-chi, Taichong, 10 Mar 2012;

NMMB-P HO-224 (tissue accession GN10111), female 919 mm TL, 22°26'N, 120°30'E, Dong-gang, 19 Mar 2012; NMMB-P HO-277, female, 923 mm TL, 22°26'N, 120°30'E, Dong-gang, 21 Mar 2012.

Remarks: Common in Taiwan, particularly off northwestern Taiwan.

Conservation status: Data Deficient.

***Mustelus manazo* Bleeker, 1855**

Starspotted Smoothhound / 星貂鯊

Mustelus manazo Bleeker, 1855: 126. Syntypes (3): RMNH 7396, 350–460 mm TL, Nagasaki, Japan.

Local synonymy: *Galeorhinus manazo*: Nakamura, 1936: 38, pl. 9, fig. 2. *Mustelus griseus*: Liang, 1951: 3; Chen, 1956: 19; Chu, 1957: 14 (Penghu Islands); Teng, 1962: 103. *Mustelus manazo*: Matsubara, 1936b: 62, fig. 44; Chen, 1948: 31; Chen, 1956: 19; Teng, 1962: 102, fig. 27 (Keelung); Chen, 1963: 46, fig. 12 (THUP 0972); Shen, 1984a: 58, fig.; Chen & Yu, 1986: 132; Chen & Joung, 1993: 58, pl. 6 (fig. 8); Shao *et al.*, 1993: 133; Yamaguchi *et al.*, 1998: 732; Yamaguchi & Taniuchi, 2000: 1039; Yamaguchi *et al.*, 2000: 221; Chen *et al.*, 2001; Yamaguchi *et al.*, 2003: 337; White & Last, 2008: 194; Shen & Wu, 2011: 66.

Taiwan voucher material: (28 spec.) FRIP 00706 (2 of 3 spec.); NMMB-P 3228; NMMB-P 4698-2 (1 of 4 spec.), Penhu, 8 Jul 1967; NMMB-P 6440, Penhu, 20 Jan 1961; NMMB-P 6449, Keelung, 18 Dec 1960; NMMB-P 6450, Taichong, 18 Jan 1962; CSIRO H 6292-23, female 506 mm TL, Da-xi, 21 May 2005; CSIRO H 6293-33, adult male 723 mm TL, CSIRO H 6293-34, adult male 616 mm TL, CSIRO H 6293-35, adult male 707 mm TL, CSIRO H 6293-32, juvenile male 513 mm TL, Da-xi, 22 May 2005; CAS uncatalogued (TAI-148), adult male 668 mm TL, CSIRO H 6294-28, embryo 275 mm TL, CSIRO H 6294-29, 2 embryos 244 and 246 mm TL, CSIRO H 6294-32, female 867 mm TL, UF 159311-1, adult male 706 mm TL, UF 159311-2, adult male 765 mm TL, Da-xi, 23 May 2005; NMMB-P 12205, NMMB-P 12206, Da-xi, 22 Jan 2010; MNHN 2013-0512 (tissue accession GN9915), female 459 mm TL, MNHN 2013-0513 (tissue accession GN9916), female 508 mm TL, Da-xi, 13 Mar 2012; HUMZ 213812, juvenile male 525 mm TL, HUMZ 213813 (tissue accession GN10043), juvenile male 468 mm TL, AMNH 258162, female 387 mm TL, CAS 236069 (tissue accession GN10043), juvenile male 387 mm TL, Da-xi, 14 Mar 2012; HUMZ 213814, female 575 mm TL, MNHN 2013-0514 (tissue accession GN10071), adult male 650 mm TL, Da-xi, 15 Mar 2012.

Remarks: Very common bycatch in commercial bottom trawling and longlining fisheries, particularly off northeastern Taiwan. Population genetic studies have shown that the Taiwanese populations are separate from Japanese populations (Chen *et al.*, 2001); females and males in Taiwan are adult at a smaller size, at an earlier age and have a shorter life span than in Japan (Yamaguchi *et al.*, 1998, 2000). Juveniles often lack white spots and can be mistaken for *M. griseus*, but can be readily distinguished in having upper labial furrows distinctly longer than lowers, versus lower labial furrows longer in *M. griseus*.

Conservation status: Data Deficient.

Genus *Triakis* Müller & Henle, 1838a

Leopard Sharks / 皺唇鯊屬

Triakis Müller & Henle, 1838a: 36. Type species: *Triakis scyllium* Müller & Henle 1839, by subsequent monotypy; appeared first without species.

***Triakis scyllium* Müller & Henle, 1839**

Banded Houndshark / 鰲唇鯊

Triakis scyllium Müller & Henle, 1839: 63, pl. 26. Holotype: RMNH (dried), Japan.

Local synonymy: Triakis scyllium: Jordan & Evermann, 1902: 318; Jordan & Richardson, 1909: 162; Fowler, 1941: 198 (Formosa); Chen, 1948: 32; Chen, 1956: 19; Teng, 1962: 107; Chen & Joung, 1993: 58, pl. 6 (fig. 9); Qiu, 1994: 131; Nakabo, 2002: 134, fig.; Shao et al., 2008: 236; Shen & Wu, 2011: 67, figs. Triakis scyllia: Matsubara, 1955: 118 (Taiwan); Chen, 1963: 49; Chen & Yu, 1986: 132.

Taiwan voucher material: No specimen examined in this study.

Remarks: Infrequently landed by bottom trawl and longline fisheries in Taiwanese waters. *Hemigaleus pingi* Evermann & Shaw, 1927 described from Wenchow in China is a junior synonym of this species. Commonly exhibited in public aquaria in China and Japan. No specimen examined in the present study, but these were infrequently seen at the Keelung fish market in April-May 1988 (DAE, pers. obs.).

Conservation status: Least Concern.

Family Hemigaleidae Hasse, 1879

Weasel Sharks / 半沙條鯊科

Genus *Chaenogaleus* Gill, 1862

Hooktooth Shark / 尖齒鯊屬

Chaenogaleus Gill, 1862: 400, 402. Type species: *Hemigaleus macrostoma* Bleeker, 1852, by original designation (also by monotypy).

***Chaenogaleus macrostoma* (Bleeker, 1852)**

Hooktooth Shark / 大口尖齒鯊

Hemigaleus macrostoma Bleeker, 1852: 46, pl. 2, fig. 10. Syntype: BMNH 1867.11.28.197, male 699 mm TL, Jakarta and Semarang, Java, Indonesia.

Local synonymy: Hemigaleus balfouri: Nakamura, 1936: 71, 52 (Keelung); Matsubara, 1936b: 24, pl. 15, fig. 1 (Keelung); Chen, 1948: 33; Chen, 1956: 19; Shen, 1984a: 61, fig. Hemigaleus macrostoma: Nakamura, 1936: 33, pl. 14, fig. 2; Matsubara, 1936b: 70, fig. 51 (Java and Formosa); Chen, 1948: 33; Chen, 1956: 19; Shen, 1984a: 62, fig. Negogaleus balfouri: Matsubara, 1955: 119; Teng, 1962: 117; Chen, 1963: 72, fig. 21 (THUP 1772); Chen & Yu, 1986: 139. Negogaleus macrostoma: Matsubara, 1955: 119; Teng, 1962: 116; Chen, 1963: 75, fig. 23? (THUP 0005); Chen & Yu, 1986: 140. Chaenogaleus macrostoma: Chen & Joung, 1993: 59; Shen & Wu, 2011: 67, fig.

Taiwan voucher material: (6 spec.) NMMB-P 4778, Taichong, 1 Oct 1959; NMMB-P 6411, Taichong, 20 Apr 1962; NMMB-P 6414-1 (1 of 2 spec.), Kaohsiung, 4 Aug 1965; NMMB-P 6444, Taichong, 6 May 1962; NMMB-P 6446-1 (1 of 2 spec.), Taichong, 22 Feb 1962; NMMB-P 6447, Taichong, 22 Feb 1962.

Remarks: Drawing of *N. macrostoma* in Chen (1963) possibly not of this species but unclear as to the taxon involved without specimen examination. Appears to be quite rare in landings in Taiwanese waters. The synonymy of this species is complicated; *Hemigaleus balfouri* Day, 1878 is considered a junior synonym, but historically this name has been used for various hemigaleid species; the illustration of *N. balfouri* in Chen (1963) is clearly of

C. macrostoma, but the illustration of *H. macrostoma* is not as clear; literature which refers to either *N. balfouri* and *H. macrostoma* have all been included in the synonym for this species, but it is possible that at least some of these literature records were misidentifications of another hemigaleid species. No, or very few, records in the last few decades suggesting this species may be largely extirpated from Taiwanese waters.

Conservation status: Vulnerable.

Genus *Hemigaleus* Bleeker, 1852

Weasel Sharks / 半沙條鯊屬

Hemigaleus Bleeker, 1852: 45. Type species: *Hemigaleus macrostoma* Bleeker, 1852, by subsequent designation.

***Hemigaleus microstoma* Bleeker, 1852**

Sicklefin Weasel Shark / 小口半沙條鯊

Hemigaleus microstoma Bleeker, 1852: 46, pl. 2, fig. 9. Syntypes (2): BMNH 1867.11.28.173, female 703 mm TL, Jakarta, Java, Indonesia; second syntype location not known and possibly lost.

Local synonymy: *Negogaleus microstoma*: Chen, 1948: 33; Chen, 1963: 74, fig. 22 (THUP 1771). *Hemigaleus pingi*: Chen, 1948: 34. *Hemigaleus microstoma*: Shen, 1984a: 62, fig.; Chen & Yu, 1986: 140; Chen & Joung, 1993: 59, pl. 6 (fig. 10); Shen & Wu, 2011: 67, fig.

Taiwan voucher material: (4 spec.) NMMB-P 6434-1 (1 of 2 spec.), NMMB-P 6441, Wu-Chi, Taichong, 20 Apr 1962; NMMB-P 6453-1 (1 of 2 spec.), Taichong, 22 Feb 1962; NMMB-P 6455, Taichong, 8 May 1962.

Remarks: TFRI uncatalogued, Kaohsiung, caught off Liuchiu Island, examined and photographed by DAE 29 Apr 1988. Not particularly common in fisheries landings in Taiwanese waters. DAE examined and photographed a specimen at the TFRI, Kaohsiung that had been caught off Liuchiu Island. *Negogaleus brachygnathus* Chu, 1960, described from off Yinge Hai in China, is a junior synonym of this species. Appears to be naturally low in abundance where it occurs and possibly rare in Taiwanese waters presently.

Conservation status: Vulnerable.

Genus *Hemipristis* Agassiz, 1843

Snaggletooth Shark / 半鋸鯊屬

Hemipristis Agassiz, 1843: 237, 302. Type species: *Hemipristis serra* Agassiz, 1843, by subsequent designation; based on a fossil type species.

***Hemipristis elongata* (Klunzinger, 1871)**

Snaggletooth Shark / 長半鋸鯊

Dirrhizodon elongatus Klunzinger, 1871: 665. Holotype: SMNS 1640 (dry), Al-Qusair, Egypt, Red Sea; type probably lost.

Local synonymy: *Hemipristis elongatus*: Chen, 2004: 21.

Taiwan voucher material: (1 specimen) NMMB-P 6424, Taichong, 16 Dec 1962.

Remarks: A very common species at fish markets, especially in Keelung in May 1988 (DAE, pers. obs.), but not a particularly common species in fisheries landings in Taiwanese waters in recent years. *Paragaleus acutiventralis* Chu, 1960, described from off Bei-Hai in China, is a junior synonym of this species. Similar to *Chaenogaleus macrostoma* but differs in dentition and in having strongly falcate fins (vs. not falcate). Historically probably confused with *C. macrostoma* and records of *Negogaleus balfouri* and *N. macrostoma* may actually refer to this species. Appears to be naturally low in abundance where it occurs and possibly rare in Taiwanese waters presently.

Conservation status: Vulnerable.

Genus *Paragaleus* Budker, 1935

Slender Weasel Sharks / 副沙條鯊屬

Paragaleus Budker, 1935: 107. Type species: *Paragaleus gruveli* Budker, 1935, by monotypy.

***Paragaleus randalli* Compagno, Krupp & Carpenter, 1996**

Slender Weasel Shark / 藍氏副沙條鯊

Paragaleus randalli Compagno, Krupp & Carpenter, 1996: 393, figs 1–4. Holotype: BPBM 21196, adult male 719 mm TL, Bahrain, Arabian Gulf.

Local synonymy: *Paragaleus randalli*: White & Harris, 2013: 181.

Taiwan voucher material: (4 spec.) FRIP 03574 (2 spec.) juvenile male 526 mm TL, female 488 mm TL; PMH (Mark Harris private collection) 129–02, female 807 mm TL, PMH 129–03, female 650 mm TL, Kaohsiung (jaws only).

Remarks: Not previously recorded from Taiwanese waters. Recent examination of Taiwanese material discovered two specimens that were not conspecific with *Paragaleus tengi*, the only *Paragaleus* species previously known from Taiwanese waters, but are conspecific with *P. randalli* from the Indo-West Pacific (White & Harris, 2013). No specimens observed from Taiwan in recent decades and probably a naturally rare species that is possibly largely extirpated from Taiwanese waters.

Conservation status: Near Threatened.

***Paragaleus tengi* (Chen, 1963)**

Straight-tooth Weasel Shark / 鄧氏副沙條鯊

Negogaleus tengi Chen, 1963: 77, fig. 24. Syntypes (3): THUP 01802-04, 750–810 mm, Taichung fish market, Taiwan; types lost. Neotype: NMMB-P 6452 (formerly THUP 1807), adult male 745 mm TL, Taichone, Taiwan; neotype designation by White & Harris (2013).

Local synonymy: *Negogaleus tengi*: Chen, 1963: 77; Chen & Yu, 1986: 140. *Hemigaleus tengi*: Shen, 1984a: 62, fig. *Paragaleus tengi*: Chen & Joung, 1993: 60; Shao *et al.*, 2008: 236; Ho & Shao, 2011: 18; Shen & Wu, 2011: fig.; White & Harris, 2013: 173, figs. 1–3.

Taiwan voucher material: (1 specimen) NMMB-P 6452 (neotype), adult male 745 mm TL, Wu-chi fish market, Taichong, 20 Apr 1962.

Remarks: DAE examined a few *Paragaleus* specimens (identified as *P. tengi*) landed at the Da-xi, May 1988; these specimens (not retained) were identified as *P. tengi*, which at the time was the only *Paragaleus* species thought to occur in Taiwanese waters since *P. randalli* was not described until 1996. Known from only a few specimens; very rare in landings and probably a naturally rare species which is possibly largely extirpated from Taiwanese waters. *Negogaleus longicaudatus* Bessednov, 1966, described from the Gulf of Tonkin, is considered a junior synonym of this species following Compagno (1984); re-examination of the types of *N. longicaudatus* would be important to ensure it is a junior synonym of *P. tengi* and not a senior synonym of *P. randalli*.

Conservation status: Data Deficient.

Family Carcharhinidae Jordan & Evermann, 1896

Requiem Sharks / 真鯊科

Genus *Carcharhinus* Blainville, 1816

Whaler Sharks / 真鯊屬

Carcharhinus (subgenus of *Squalus*) Blainville, 1816: 121. Type species: *Carcharias melanopterus* Quoy & Gaimard, 1824, by subsequent designation of the International Commission on Zoological Nomenclature.

***Carcharhinus albimarginatus* (Rüppell, 1837)**

Silvertip Shark / 白邊鰭真鯊

Carcharias albimarginatus Rüppell, 1837: 164, pl. 18 (fig. 1). Lectotype: SMF 3582 (dry and mounted), juvenile male 1025 mm, Ras Muhammad, Sinai, Egypt, Red Sea; lectotype designated by Rosenblatt & Baldwin (1958).

Local synonymy: *Carcharhinus albimarginatus*: Nakamura, 1936: 27, pl. 22, fig. 1; Matsubara, 1936b: 82, fig. 62; Chen, 1948: 37; Chen, 1956: 20; *Carcharhinus albimarginatus*: Teng, 1962: 139; Chen, 1963: 68; Shen, 1984a: 61, fig.; Chen *et al.*, 1985: 10, fig. 1; Chen & Yu, 1986: 137; Chen & Joung, 1993: 61, pl. 7 (fig. 1); Shen & Wu, 2011: 68, fig.

Taiwan voucher material: No specimens examined in this study. Chen *et al.* (1985) examined the following specimens: NMF 0146, male 1875 mm TL; NMF 0229, female 1589 mm TL; there is no information on their current status.

Remarks: Not commonly landed in Taiwanese waters.

Conservation status: Near Threatened.

***Carcharhinus altimus* (Springer, 1950)**

Bignose Shark / 大鼻真鯊

Eulamia altima Springer, 1950: 9. Holotype: USNM 133828, juvenile male “52 inches” (~1321 mm), off Cosgrove Reef, Key West, Florida, USA.

Local synonymy: *Carcharhinus altimus*: Chen *et al.*, 1985: 10, fig. 2 (NMF 392, female 1240 mm TL); Chen & Joung, 1993: 61, pl. 7 (fig. 2); Shao *et al.*, 2008: 236; Shen & Wu, 2011: 68, fig.

Taiwan voucher material: No specimens examined in this study.

Remarks: Does not appear to be commonly landed in Taiwanese waters; often confused with *C. plumbeus* but differs in having a lower first dorsal fin (its height $< \frac{1}{2}$ vs. about $\frac{1}{2}$ of predorsal length), upper anterolateral teeth very high (usually 15 vs. 14 rows), slightly longer snout, and anterior nasal flaps high and triangular (vs. low and inconspicuous).

Conservation status: Data Deficient.

***Carcharhinus amblyrhynchos* (Bleeker, 1856)**

Grey Reef Shark / 鈍吻真鯊

Carcharias (Prionodon) amblyrhynchos Bleeker, 1856: 467. Holotype: RMNH 7377 (head and skin), female 1540 mm TL, near Solombo Island, Java Sea, Indonesia.

Local synonymy: *Carcharhinus amblyrhynchos*: Chen & Joung, 1993: 62, pl. 7 (fig. 3); Shen & Wu, 2011: 69, fig.

Taiwan voucher material: No specimens examined in this study.

Remarks: Appears to be rare in Taiwanese waters, either naturally or due to extirpation.

Conservation status: Near Threatened.

***Carcharhinus brachyurus* (Günther, 1870)**

Bronze Whaler / 短尾真鯊

Carcharias brachyurus Günther, 1870: 369. Neotype: NMNZ P. 2262, female 2420 mm TL, off Wanganui, New Zealand; neotype designation by Garrick (1982); original type material in BMNH are apparently lost, and two Australian embryos referred to by Günther (1870) are actually *C. leucas* (see Garrick, 1982).

Local synonymy: Chen & Yu, 1986: 138.

Taiwan voucher material: No specimens examined in this study.

Remarks: Possibly only extralimital records from Taiwanese waters. Previous records of this species are misidentifications of *C. falciformis* (Chen *et al.*, 1985); Naylor *et al.* (2012) included a sample of *C. brachyurus* from Taiwan sampled at Su-Ao longliner landing by GN 1994, but exact capture locality not recorded.

Conservation status: Near Threatened.

***Carcharhinus brevipinna* (Müller & Henle, 1839)**

Spinner Shark / 直齒真鯊

Carcharias brevipinna Müller & Henle, 1839: 31, pl. 9. Holotype: RMNH D2525 (mounted skin), 785 mm TL, Java, Indonesia.

Local synonymy: *Carcharhinus brevipinna*: Chen *et al.*, 1985: 11, fig. 3 (5 spec., 1442-2560 mm TL); Chen & Joung, 1993: 62, pl. 7 (fig. 5); Joung *et al.*, 2005: 102; Shen & Wu, 2011: 69, fig.

Taiwan voucher material: No specimens examined in this study.

Remarks: Abundant off northeastern Taiwan and an important component of the commercial shark fishery in this area; about 115 tons landed annually at the Nan-fang-ao fish market (Joung *et al.*, 2005); mostly caught between October and April when waters are cooler (Liu *et al.*, 2001).

Conservation status: Near Threatened.

Carcharhinus falciformis (Müller & Henle, 1839)

Silky Shark / 鐮狀真鯊

Carcharias (Prionodon) falciformis Müller & Henle, 1839: 47. Holotype: MNHN 0000-1134, female embryo 528 mm TL, Cuba, Western Atlantic.

Local synonymy: *Carcharhinus brachyurus*: Nakamura, 1936: 23, pl. 8, fig. 2; Matsubara, 1936b: 78, fig. 58; Chen, 1948: 37; Chen, 1956: 20. *Carcharhinus brachyurus*: Teng, 1962: 132; Chen, 1963: 61; Chen & Joung, 1993: 62, pl. 7 (fig. 4); Shen & Wu, 2011: 69, fig. *Carcharhinus falciformis*: Chen & Yu, 1986: 138. *Carcharhinus falciformis*: Chen *et al.*, 1985: 11, fig. 5 (10 spec., 350-2420 mm TL); Chen & Joung, 1993: 63, pl. 7 (fig. 7); Chen, 2004: 21; Joung *et al.*, 2008; Shen & Wu, 2011: 69, 70, fig.

Taiwan voucher material: No specimens examined in this study.

Remarks: Abundant off northeastern Taiwan and are an important component of the shark fishery in this region; about 241 tons landed annually at the Nan-fang-ao fish market (Joung *et al.*, 2008); mostly caught during winter and spring when waters are cooler (Liu *et al.*, 2001); annual landings in Nan-fang-ao declined after 1990 and average weight of individuals has also decreased substantially (Joung *et al.*, 2008).

Conservation status: Near Threatened.

Carcharhinus leucas (Müller & Henle, 1839)

Bull Shark / 低鰭真鯊

Carcharias (Prionodon) leucas Müller & Henle, 1839: 42. Syntypes (4): only 2 stuffed syntypes still in existence; MNHN A-9650, adult male 1600 mm, MNHN A-9652, female 1869 mm, Antilles, Western Atlantic.

Local synonymy: *Carcharhinus leucas*: Chen & Yu, 1986:138; Chen & Joung, 1993: 63, pl. 7 (fig. 8); Shen & Wu, 2011: 70, figs.

Taiwan voucher material: No specimens examined in this study.

Remarks: Appears to be rarely encountered in Taiwanese waters. A recent molecular study suggests this species may represent a species complex, which is in need of urgent taxonomic research (Naylor *et al.*, 2012).

Conservation status: Near Threatened.

Carcharhinus limbatus (Müller & Henle, 1839)

Common Blacktip Shark / 黑邊鰭真鯊

Carcharias (Prionodon) limbatus Müller & Henle, 1839: 49, pl. 19 (teeth). Syntypes (2): only 1 syntype still in existence; MNHN 0000-3468 (mounted skin), Martinique, Lesser Antilles, Western Atlantic.

Local synonymy: *Carcharhinus melanopterus*: Matsubara, 1936b: 81, fig. 61; Chen, 1948: 37; Chen, 1956: 20. *Carcharhinus melanopterus*: Chen, 1963: 64, fig. 18 (THUP 1469); Shen, 1984a: 61, fig.; Chen & Joung, 1993: 64, pl. 8 (fig. 2); Shao *et al.*, 1993: 119; Shen & Wu, 2011: 71, fig. *Eulamia pleurotaenia*: Chu, 1957: 14. *Carcharhinus limbatus*: Chen *et al.*, 1985: 12, fig. 6 (2 spec., 1900-2290 mm TL); Chen & Yu, 1986: 138; Chen & Joung, 1993: 63, pl. 7 (fig. 9); Chen *et al.*, 1995: 20; Chen, 2004: 21; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 70, fig.

Taiwan voucher material: (3 spec.) NMMB-P 6412, female, Taichong, 28 Feb 1965; NMMB-P 6436, female, Taichong, 6 May 1962; NMMB-P 6454, female, Penghu, 8 Sep 1961.

Remarks: Little information on the abundance of this species in Taiwan; appears to be rare. Previously reported as *C. melanopterus* in Taiwanese waters. A recent molecular study suggests that the Indo-Pacific populations of *C. limbatus* probably represent a distinct species to the Atlantic species (Naylor *et al.*, 2012); taxonomic investigation of this complex is required to determine whether *C. pleurotaenia* (Bleeker, 1852) should be resurrected for the Indo-Pacific species.

Conservation status: Near Threatened.

***Carcharhinus longimanus* (Poey, 1861)**

Oceanic Whitetip Shark / 長鰭真鯊

Squalus longimanus Poey, 1861: 338, pl. 19 (figs 9 and 10). Holotype: male 1640 mm, no type known, Cuba, Western Atlantic.

Local synonymy: *Carcharhinus melanopterus*: Nakamura, 1936: 25, pl. 10, figs. 1 and 2. *Carcharhinus lamia*: Chen, 1948: 37; *Carcharhinus longimanus*: Teng, 1958: 22, fig. 14; Teng, 1962: 134, fig. 35; Chen, 1963: 69; Shen, 1984a: 61, fig.; Chen *et al.*, 1985: 12, fig. 7 (4 spec., 270-1540 mm TL); Chen & Yu, 1986: 137; Chen & Joung, 1993: 64, pl. 7 (fig. 10); Chen *et al.*, 1995: 20; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 70, fig. *Pterolamiops longimanus*: Yang, 1981: 3, fig. 2.

Taiwan voucher material: (2 spec.) NMMB-P 4516, male, Kaohsiung, 1 Apr 1963; NMMB-P 15727.

Remarks: Common in landings at the Nan-fang-ao fish market, with an average of 27.5 tons landed annually from 1989–1994 (Chen *et al.*, 2002); mainly caught from June to August off northeastern Taiwan at depths of 40–120 m (Chen *et al.*, 2002).

Conservation status: Vulnerable.

***Carcharhinus macloti* (Müller & Henle, 1839)**

Hardnose Shark / 麥氏真鯊

Carcharias (Hypoprion) macloti Müller & Henle, 1839: 34, pl. 10. Holotype: RMNH (dry skin), adult male, New Guinea.

Local synonymy: *Hypoprion macloti*: Nakamura, 1936: 21, pl. 8, fig. 1; Chen, 1948: 38; Chen, 1956: 19; Teng, 1962: 13; Chen, 1963: 59, fig. 16 (THUP 0532); Shen, 1984a: 60, fig.; Chen & Yu, 1986: 137; Shao *et al.*, 1993: 119. *Carcharhinus macloti*: Chen *et al.*, 1985: 13, fig. 8 (NMF 406, 970 mm TL); Chen & Joung, 1993: 64, pl. 8 (fig. 1); Shen & Wu, 2011: 71, fig.

Taiwan voucher material: (3 spec.) NMMB-P 6445, Taichong, 6 May 1962; NMMB-P 6493, female, Taichong, 4 Jan 1962; UF 159313, juvenile male 542 mm TL, Da-xi, 24 May 2005.

Remarks: Relatively commonly landed in coastal Taiwanese waters.

Conservation status: Near Threatened.

Carcharhinus melanopterus (Quoy & Gaimard, 1824)

Common Blacktip Shark / 汙翅真鯊

Carcharias melanopterus Quoy & Gaimard, 1824: 194, pl. 43 (figs 1 and 2). Lectotype: MNHN 0000-1129, juvenile male 590 mm TL, Pulau Waigeo, West Papua, Indonesia; lectotype designation by Eschmeyer (1998).

Local synonymy: *Carcharhinus melanopterus*: Teng, 1962: 137; Chen *et al.*, 1985: 13, fig. 9 (2 spec., 902-1147 mm TL); Chen & Yu, 1986: 137.

Taiwan voucher material: (1 specimen) NMMB-P 15731.

Remarks: Apparently rare in Taiwanese waters; early records of this species are mostly referable to *C. limbatus*.

Conservation status: Near Threatened.

Carcharhinus obscurus (Lesueur, 1818)

Dusky Shark / 灰色真鯊

Squalus obscurus Lesueur, 1818: 223, pl. 9. No types known; east coast of USA.

Local synonymy: *Carcharhinus obscurus*: Chen et al., 1985: 14, fig. 10 (8 spec., 830-2250 mm TL); Chen & Yu, 1986: 138; Chen & Joung, 1993: 64, pl. 8 (fig. 3); Shen & Wu, 2011: 71, fig.

Taiwan voucher material: (1 specimen) NMMB-P 6421, male, Dong-gang, Pingtung, 6 Feb 1966.

Remarks: Chen *et al.* (1985) examined the following specimens: NMF 0106, male 2110 mm TL; NMF 0149, male 1695 mm TL; NMF 0422, male 3220 mm TL; NMF 0411, female 2140 mm TL; NMF 0025, female 2205 mm TL; NMF 0231, female 2195 mm TL; NMF 0136, female 830 mm TL; NMF 0126, female 1010 mm TL; there is no information on their current status. Abundant in landings at the Nan-fang-ao fish market, with an average of 242.5 tons landed annually from 1989–1994; main fishing season is October to April (Chen *et al.*, 2002).

Conservation status: Vulnerable.

Carcharhinus plumbeus (Nardo, 1827)

Sandbar Shark / 鉛灰真鯊

Squalus plumbeus Nardo, 1827: 26, 35 (no. 24). No types known; Adriatic Sea.

Local synonymy: *Carcharhinus* sp. (*gangeticus*?): Nakamura, 1936: 28, pl. 10, pl. 11, fig. 2. *Carcharhinus gangeticus*: Teng, 1962: 138. *Carcharhinus plumbeus*: Chen *et al.*, 1985: 14, fig. 11 (6 spec., 180-1880 mm TL); Chen & Yu, 1986: 137; Chen & Joung, 1993: 65, pl. 8 (fig. 4); Shao *et al.*, 1993: 119; Joung & Chen, 1995: 659; Joung *et al.*, 2004: 83; Shen & Wu, 2011: 71, fig.

Taiwan voucher material: No specimens examined in this study.

Remarks: One of the most abundant species in the commercial shark fishery off northeastern Taiwan; over 170 tons landed annually and the second most abundant shark species (Joung *et al.*, 2004). Mostly caught between November and March when waters are cooler. Catches declined in recent years and average sizes have also decreased substantially (Joung *et al.*, 2004). Chen *et al.* (1985) considered the records of *C. gangeticus* by Teng (1962) and *C. sp. (gangeticus?)* by Nakamura (1936) as *C. plumbeus*. A recent molecular study suggests that the Indo-Pacific populations of *C. plumbeus* probably represent a distinct species to the Western Atlantic species (Naylor *et al.*, 2012). Taiwanese *C. plumbeus* often have a pale, less pigmented trailing edge to their pectoral and first dorsal fins relative to the Western Atlantic forms (GN, pers. obs.). Taxonomic investigation of this complex is required to determine whether *C. japonicus* (Temminck & Schegel, 1850) should be resurrected for the Indo-Pacific species.

Conservation status: Vulnerable.

Carcharhinus sorrah (Müller & Henle, 1839)

Spot-tail Shark / 沙拉真鯊

Carcharias (Prionodon) sorrah Müller & Henle, 1839: 45, pl. 16. Lectotype: RMNH 4294, female 570 mm, Java, Indonesia.

Local synonymy: *Carcharhinus sorrah*: Nakamura, 1936: 24, pl. 9, fig. 1; Chen, 1948: 37; Chen, 1956: 20; Liang, 1951: 3. *Carcharhinus sorrah*: Teng, 1962: 133; Chen, 1963: 62. Fig. 17 (THUP 1770); Chen *et al.*, 1985: 15, fig. 12 (4 spec., 680-1370 mm TL); Chen & Yu, 1986: 137; Chen & Joung, 1993: 65, pl. 8 (fig. 5); Shao *et al.*, 1993: 119; Chen, 2004: 22; Shen & Wu, 2011: 71, 72, fig.

Taiwan voucher material: (5 spec.) FRIP 00706 (1 of 3), 1951; FRIP 03643; NMMB-P 15122, Kaohsiung, 4 Aug 1965; NMMB-P 6415, Dong-gang, Pingtung, 1 Aug 1963; NMMB-P 12656.

Remarks: Commonly caught by coastal fisheries in Taiwan.

Conservation status: Near Threatened.

Carcharhinus tjujot (Bleeker, 1852)

Spot-tail Shark / 爪哇真鯊

Carcharias (Prionodon) tjujot Bleeker, 1852: 36, pl. 1 (fig. 4). Lectotype: RMNH 7382, adolescent male 585 mm, Jakarta (Batavia), Java, Indonesia.

Local synonymy: *Carcharhinus menisorrah*: Nakamura, 1936: 26, pl. 12, fig. 1; Matsubara, 1936b: 80, fig. 60; Chen, 1948: 37; Chen, 1956: 20. *Carcharhinus menisorrah*: Teng, 1962: 138; Chen, 1963: fig. 19 (THUP 1472). *Carcharhinus tjujot*: White, 2012: 1, figs 1–3. *Carcharhinus dussumieri*: Teshima & Mizue, 1973: 229 (information from H.-C. Yang); Chen *et al.*, 1985: 11, fig. 4 (2 spec., 784-1140 mm TL); Chen & Yu, 1986: 137; Chen & Joung, 1993: 63, pl. 7 (fig. 6); Shao *et al.*, 1993: 119; Chen, 2004: 21; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 69, fig.

Taiwan voucher material: (8 spec.) FRIP 02062; NMMB-P 6422, Keelung, 1 Nov 1959; NMMB-P 6423, Taichong, 21 Apr 1962; NMMB-P 6425, Kaohsiung, 4 Aug 1965; NMMB-P 6458, Keelung, 18 Dec 1960; CAS 228336, juvenile male 498 mm TL, Da-xi, 24 May 2005; NMMB-P 15747 (tissue accession GN10187), NMMB-P 15767 (tissue accession GN10188), 24 Apr 2011.

Remarks: Commonly caught by coastal fisheries in Taiwanese waters; Teshima & Mizue (1973) stated that according to H.-C. Yang from TRFI, this species is landed year round at Keelung and Kaohsiung. Previously referred to as *C. dussumieri* but a recent taxonomic study revealed that *C. dussumieri* is restricted to the Western Indian Ocean and resurrected *C. tjujot* (pronounced 'choo-choot') for the Western Pacific species, from Indonesia to Taiwan (White, 2012). Historically referred to as *C. menisorrah* but this species is actually a junior synonym of *C. falciformis*.

Conservation status: Not Evaluated.

Genus *Galeocerdo* Müller & Henle, 1837a

Tiger Shark / 鼬鯊屬

Galeocerdo Müller & Henle, 1837a: 115. Type species: *Squalus arcticus* Faber, 1829, by subsequent designation in Bonaparte (1838).

***Galeocerdo cuvier* (Péron & Lesueur in Lesueur, 1822)**

Tiger Shark / 鼬鯊

Squalus cuvier Péron & Lesueur in Lesueur, 1822: 351. No types known; northwestern Australia.

Local synonymy: *Galeocerdo rayneri*: Nakamura, 1934: 486; Nakamura, 1936: 30, pl. 13, fig. 1; Matsubara, 1936b: 68, fig. 50; Chen, 1948: 34; Chen, 1956: 19; Teng, 1962: 119. *Galeocerdo arcticus*: Nakamura, 1936: 31, pl. 13, fig. 2; Chen, 1948: 34; Chen, 1956: 19; *Galeocerdo cuvier*: Teng, 1962: 118, fig. 31; Chen, 1963: 78; Chen & Joung, 1993: 65, pl. 8 (fig. 6); Chen, 2004: 22; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 72, fig. *Galeocerdo cuvieri*: Chen & Yu, 1986: 140.

Taiwan voucher material: (2 spec.) ASIZP 60903, 1010 mm TL, Da-xi, 12 Aug 2001; NMMB-P 15768, 30 Aug 2010.

Remarks: Abundant in landings at the Nan-fang-ao fish market, with an average of 31.4 tons landed annually from 1989–1994; main fishing season at Nan-fang-ao is June and July (Chen *et al.*, 2002). Considered monotypic but recent molecular studies have revealed that there is possibly two species, one in the Atlantic Ocean and one in the Indo-Pacific (Naylor *et al.*, 2012); if two species are considered valid for in this genus, *G. cuvier* will be retained for the Indo-Pacific species.

Conservation status: Near Threatened.

Genus *Loxodon* Müller & Henle, 1838

Sliteye Shark / 彎齒鯊屬

Loxodon Müller & Henle, 1838a: 36. Type species: *Loxodon macrorhinus* Müller & Henle, 1839, by subsequent monotypy; appeared first with no included species.

***Loxodon macrorhinus* Müller & Henle, 1839**

Sliteye Shark / 廣鼻彎齒鯊

Loxodon macrorhinus Müller & Henle, 1839: 61, pl. 25. Holotype: ZMB 4479, embryo 315 mm TL, locality unknown (probably Indian Ocean).

Local synonymy: *Loxodon macrorhinus*: Chen & Yu, 1986: 137; Chen & Joung, 1993: 66, pl. 8 (fig. 7); Chen, 2004: 22; Shen & Wu, 2011: 72, fig.

Taiwan voucher material: (3 spec.) NMMB-P 6443, Wu-chi, Taichong, 1 Dec 1962; NMMB-P 6456, Wu-chi, Taichong, 1 Sep 1960; NMMB-P 6457, Keelung, 1 Oct 1959.

Remarks: Relatively commonly caught by coastal fisheries in Taiwan. Considered monotypic but recent molecular studies have revealed that there is likely two species occurring in the Indo-West Pacific (Naylor *et al.*, 2012).

Conservation status: Least Concern.

Genus *Negaprion* Whitley, 1940

Lemon Sharks / 檸檬鯊屬

Negaprion Whitley, 1940: 111. Type species: *Aprionodon acutidens queenslandicus* Whitley, 1939, by original designation, a junior synonym of *Negaprion acutidens* (Rüppell, 1837); for purposes of the type species, the subspecies *queenslandicus* is elevated to species level (Eschmeyer, 2012).

***Negaprion acutidens* (Rüppell, 1837)**

Sicklefin Lemon Shark / 尖齒檸檬鯊

Carcharias acutidens Rüppell, 1837: 65, pl. 18 (fig. 3). Lectotype: SMF 2825 (stuffed), 680 mm TL, Jeddah, Saudi Arabia, Red Sea; lectotype designation by Klauswitz (1960).

Local synonymy: *Negaprion acutidens*: Chen et al., 1995: 20; Shao *et al.*, 2008: 236.

Taiwan voucher material: (1 specimen) NMMB-P 15766, Dong-sha Island, 25 Sep 2010.

Remarks: Appears to be rare in Taiwanese waters; lack of historical records may be due to misidentifications. In some areas, has been mistaken for *Glyphis* species and it is possible that records of *G. gangeticus* from Taiwan (Chen & Joung, 1993, Shen & Wu, 2011) may be misidentifications of this species.

Conservation status: Vulnerable.

Genus *Prionace* Cantor, 1849

Blue Shark / 藍鯊屬

Prionace Cantor, 1849: 1381. Type species: *Squalus glaucus* Linnaeus, 1758, designated by the ICZN (on official list, Opinion 723.3d, 1965, name no. 1660).

***Prionace glauca* (Linnaeus, 1758)**

Blue Shark / 鋸峰齒鯊 / 水鯊

Squalus glaucus Linnaeus, 1758: 235. No types known; northeastern Atlantic (localities include England and Italy).

Local synonymy: *Galeus glaucus*: Nakamura, 1936: 32, pl. 14, fig. 1. *Prionace glauca*: Chen, 1948: 38; Chen, 1956: 20; Teng, 1962: 140; Chen, 1963: 70, fig. 20 (THUP 1324); Chen & Yu, 1986: 139; Chen & Joung, 1993: 67, pl. 8 (fig. 8); Shao *et al.*, 2008: 236; Shen & Wu, 2011: 72, figs.

Taiwan voucher material: (2 spec.) NMMB-P 4091, Taichone, 1 Apr 1961; NMMB-P 4096, Dong-gang, Pingtung, 19 Mar 1961.

Remarks: Relatively abundant in oceanic Taiwanese waters; major fishing season for this species is May to August at Nan-fang-ao and February to May at Cheng-gong according to Chen *et al.* (2002).

Conservation status: Near Threatened.

Genus *Rhizoprionodon* Whitley, 1929

Sharpnose Sharks / 曲齒鯊屬

Rhizoprionodon Whitley, 1929: 354; a replacement name for *Rhizoprion* Ogilby, 1915, preoccupied by *Rhizoprion* Jourdan, 1861 in mammals. Type species: *Carcharias (Scoliodon) crenidens* Klunzinger, 1880, by original designation, a junior synonym of *Carcharias acutus* Rüppell, 1837.

***Rhizoprionodon acutus* (Rüppell, 1837)**

Milk Shark / 尖頭曲齒鯊

Carcharias acutus Rüppell, 1837: 65, pl. 18 (fig. 4). Lectotype: SMF 2783 (stuffed), 440 mm, Jeddah, Saudi Arabia, Red Sea.

Local synonymy: *Scoliodon walbeehmi*: Jordan & Evermann, 1902: 318; Jordan & Richardson, 1909: 161, pl.63, fig.2; Fowler, 1930: 494; Fowler, 1941:134. *Scoliodon palasorrah*: Chen, 1948: 35; Chen, 1956: 19; Matsubara, 1955: 120 (Taiwan); Chen, 1963: 56, fig. 15 (THUP 1319); Teng, 1962: 124, fig. 33. *Rhizoprionodon acutus*: Chen & Yu, 1986: 137; Chen & Joung, 1993: 67, pl. 8-9; Shao *et al.*, 2008: 236; Shao *et al.*, 1993: 119; Chen, 2004: 22; Shen & Wu, 2011: 73, fig. (note: fig. is probably not of this species and likely *Scoliodon macrorhynchos*).

Taiwan voucher material: (7 spec.) NMMB-P 15125, Penghu, 8 Jul 1967; NMMB-P 6416, Taichong, 6 May 1960; NMMB-P 6442, Taichong, 22 Feb 1962; NMMB-P 6446, Taichong, 22 Feb 1962; NMMB-P 6453, Taichong, 2 Feb 1962; NMMB-P 678, Penghu, 17 Jul 1960; NMMB-P 6683, Penghu, 1 Aug 1957.

Remarks: Commonly caught by coastal fisheries in Taiwan. Recent molecular analyses have revealed that it may represent a species complex (Naylor *et al.*, 2012); taxonomic investigation of this species complex is urgently required to determine whether the western North Pacific populations are a distinct species.

Conservation status: Least Concern.

Genus *Scoliodon* Müller & Henle, 1837a

Spadenose Sharks / 斜齒鯊屬

Scoliodon Müller & Henle, 1837a: 114. Type species: *Scoliodon laticaudus* Müller & Henle, 1838c, by subsequent monotypy.

***Scoliodon macrorhynchos* (Bleeker, 1852)**

Pacific Spadenose Shark / 寬吻斜齒鯊

Carcharias (Scoliodon) macrorhynchos Bleeker, 1852: 31, pl. 1 (fig. 1). Holotype (unique): apparently lost, male 218 mm TL, Jakarta, Java, Indonesia.

Local synonymy: Scoliodon sorrakowah: Nakamura, 1936: 20, pl. 7, fig. 2; Chen, 1948: 35; Chen, 1956: 19; Teng, 1958: 20, fig. 13; Teng, 1962: 10, fig. 32; Chen, 1963: 58; Qiu, 1994: 132. Scoliodon laticaudus: Okada, 1938: 119; Chen & Yu, 1986: 137; Chen & Joung, 1993: 67, pl. 8-10; Shen & Wu, 2011: 73, fig. Scoliodon macrorhynchos: White et al., 2010: 61, figs 1–5, 8.

Taiwan voucher material: (14 spec.) FRIP 03537; FRIP 03549; NMMB-P 6360, Kin-Man, 25 Jan 1966; NMMB-P 11096 (4 spec.), Wu-Chi, Taichong, 14 Jun 2009; CAS 235416, adult male 512 mm TL, CSIRO H 6295-21, adult male 458 mm TL, UF 159315, adult male 497 mm TL, Da-xi, 24 May 2005; AMNH 258155 (tissue accession GN9917), adult male 494 mm TL, HUMZ 213809 (tissue accession GN9920), juvenile male 332 mm TL, MNHN 2013-0450 (tissue accession GN9918), female 523 mm TL, MNHN 2013-0393 (tissue accession GN9919), juvenile male 334 mm TL, Da-xi, 13 Mar 2012.

Remarks: Very common in the catches of coastal fisheries in Taiwan. Previously considered a junior synonym of S. laticaudus from the Western Indian Ocean, but recent taxonomic study revealed the West Pacific populations are a distinct species and resurrected S. macrorhynchos for this species (White et al., 2010).

Conservation status: Not Evaluated.

Genus *Triaenodon* Müller & Henle, 1837a

Whitetip Reef Shark / 三齒鯊屬

Triaenodon Müller & Henle, 1837a: 113. Type species: *Carcharias obesus* Rüppell, 1837, by subsequent monotypy; appeared first without species then added by Bonaparte (1838).

***Triaenodon obesus* (Rüppell 1837)**

Whitetip Reef Shark / 灰三齒鯊

Carcharias obesus Rüppell, 1837: 64, pl. 18 (fig. 2). Lectotype: SMF 3149 (stuffed), 310 mm, Jeddah, Saudi Arabia, Red Sea; lectotype designation by Klausewitz (1960).

Local synonymy: Triaenodon obesus: Teng, 1958: 18, fig. 12; Teng, 1962: 104, fig. 28; Chen, 1963: 51; Chen & Joung, 1993: 68, pl. 9 (fig. 1); Shen & Wu, 2011: 73, fig.

Taiwan voucher material: No specimens examined in this study.

Remarks: Appears to be rare in Taiwanese waters, either naturally or due to extirpation.

Conservation status: Near Threatened.

Family Sphrynidae Gill, 1872

Hammerhead Sharks / 雙髻鯊科

?Genus *Eusphyra* Gill, 1862

Winghead Shark / 真雙髻鯊屬

Eusphyra Gill, 1862: 403. Type species: *Zygaena blochii* Cuvier, 1816, by original designation (and by monotypy).

?*Eusphyra blochii* (Cuvier, 1816)

Winghead Shark / 布氏真雙髻鯊

Zygaena blochii Cuvier, 1816: 127. Holotype: ZMB 7835 (stuffed), female 525 mm TL, no type locality (Fowler, 1941 thought type was from India).

Local synonymy: None.

Taiwan voucher material: No specimens with confirmed locality examined in this study.

Remarks: A coastal dwelling species common in some parts of its range; highly susceptible to coastal fisheries due to its very broad, wing-like head; possibly largely extirpated from heavily fished areas such as Indonesia and possibly southern China. No specific records of this species in Taiwan and not reported in local checklists and faunal guides; Compagno (1984), Compagno *et al.* (2005) and Last & Stevens (2009) include Taiwan in the known distribution of this species; since it is a very distinctive shark, misidentifications are unlikely. A specimen of this species at the Taiwan Fisheries Research Institute in Keelung (FRIP 03626) has no locality data and there is a possibility it came from another country, e.g. northern Australia where a number of other specimens in the same collection were collected.

Conservation status: Near Threatened.

Genus *Sphyrna* Rafinesque, 1810a

Hammerhead Sharks / 雙髻鯊屬

Sphyrna Rafinesque, 1810a: 60. Type species: *Squalus zygaena* Linnaeus, 1758, by subsequent designation (Bonaparte, 1838).

***Sphyrna lewini* (Griffith & Smith, 1834)**

Scalloped Hammerhead / 路氏雙髻鯊

Zygaena lewini Griffith & Smith, 1834: 640, pl. 50. No types known; from south coast of Australia [New Holland].

Local synonymy: *Sphyrna lewini*: Teng, 1958: 10, fig. 7; Teng, 1962: 79, fig. 21; Chen, 1963: 12, fig. 3 (THUP 921, THUP 154); Yang & Chen, 1971: 2, fig. 2; Yang, 1981: 4, fig. 3; Shen, 1984a: 63, fig.; Chen *et al.*, 1988: 389; Chen & Yu, 1986: 141; Chen *et al.*, 1990: 156; Chen & Joung, 1993: 68, pl. 9 (fig. 2); Shao *et al.*, 1993: 132; Liu & Chen, 1999: 218; Chen, 2004: 22; Shen & Wu, 2011: 74, fig.

Taiwan voucher material: (5 spec.) NMMB-P 4210, Penhwo, 1 Aug 1957; NMMB-P 4212, Keelung, 1 Aug 1963; NMMB-P 6279-1, Wu-Chi, Taichong, 23 Oct 1964; UF 159198, juvenile male 520 mm TL, Da-xi, 23 May 2005; NMMB-P 15780, 27 Sep 2010.

Remarks: One of the most abundant species in the commercial shark fishery off northeastern Taiwan; also common off the west and south of Taiwan; Chen *et al.* (2002) reported that over an average of 370 tons of *S. lewini* were landed annually at Nan-fang-ao between 1989 and 1994, which represents about 20% of the shark catch in this area, with the peak season from September to March. A recent molecular study revealed that this species is possibly a species complex with two species occurring in the Indo-West Pacific (Naylor *et al.*, 2012).

Conservation status: Endangered.

Sphyrna mokarran (Rüppell, 1837)

Great Hammerhead / 無溝雙髻鯊

Zygaena mokarran Rüppell, 1837: 66, pl. 17 (fig. 3). Lectotype: SMF 3590 (stuffed), male 2515 mm, Massawa, Eritrea, Red Sea; lectotype designation by Klausewitz (1960).

Local synonymy: *Sphyrna mokarran*: Chen, 1948: 39; Teng, 1958: 8, fig. 6; Teng, 1962: 75, fig. 20; Chen, 1963: 11 (TFRI 103119, TFRI 103262); Shen, 1984a: 63, fig.; Chen & Yu, 1986: 141; Chen & Joung, 1993: 68, pl. 9 (fig. 3); Shen & Wu, 2011: 74, fig.

Taiwan voucher material: No specimens examined in this study.

Remarks: Appears to be rarely caught in Taiwanese waters presently; serious declines in the populations of *Sphyrna* species have been reported worldwide, and the coastal habits of this species likely exacerbates the problem.

Conservation status: Endangered.

Sphyrna zygaena (Linnaeus, 1758)

Smooth Hammerhead / 錘頭雙髻鯊

Squalus zygaena Linnaeus, 1758: 234. Syntype: NRM LP 88, male embryo 215 mm (see Fernholm & Wheeler, 1983). Type locality: Mediterranean Sea and Atlantic (inc. Spain, France, Italy, Greece, Syria).

Local synonymy: *Zygaena malleus*: Günther, 1870: 381 (Formosa). *Sphyrna zygaena*: Jordan & Evermann, 1902: 318; Jordan & Richardson, 1909: 162; Fowler, 1941: 217 (Formosa); Chen, 1948: 39; Liang, 1951: 3; Chen, 1956: 20; Teng, 1962: 75; Chen, 1963: 14, fig. 4 (THUP 1961); Shen, 1984a: 63, fig.; Chen & Yu, 1986: 142; Chen & Joung, 1993: 68, pl. 9 (fig. 4); Chen, 2004: 22; Shen & Wu, 2011: 74, fig. *Cestracion zygaena*: Nakamura, 1936: 37.

Taiwan voucher material: (3 spec.) NMMB-P 6279, Taichong, 23 Oct 1964; NMMB-P 6296, Taichong, 1 Feb 1963; NMMB-P 6569, Kaohsiung, 4 Aug 1965.

Remarks: Common in the landings of the commercial shark fishery off northeastern Taiwan; average annual landings at the Nan-fang-ao fish market between 1989 and 1994 was 65.5 tons, about 3.6% of shark landings (Chen *et al.*, 2002).

Conservation status: Vulnerable.

Order Torpediniformes

Family Torpedinidae Bonaparte, 1838

Torpedo rays/ 電鱔科

Genus *Tetronarce* Gill, 1862

Pelagic torpedoes / 電鱔屬

Tetronarce Gill, 1862. Type species: *Torpedo occidentalis* Storer, 1843, by monotypy and original designation (name appears in key; Eschmeyer, 2013).

[Note: The nominal genus *Torpedo* is universally used for pelagic as well as near-shore benthic torpedoes, with two subgenera employed—*Tetronarce* for pelagic torpedoes and *Torpedo* for inshore, primarily benthic species. In accordance with modern practice (e.g. Carvalho, in press; Carvalho & Séret, in press), however, *Tetronarce* is used here as a full genus. We also note that *Torpedo* Duméril, 1806 takes priority over *Torpedo* Houttuyn, 1764, which is commonly credited as the valid nominal genus, because the latter was not coined as a generic but as a specific name according to Welter-Schultes & Feuerstein (2008: 141)].

Tetronarce formosa (Haas & Ebert, 2006)

Taiwanese pelagic torpedo / 台灣電鱔

Torpedo formosa Haas & Ebert, 2006: 2, Figs. 1-3. Holotype: CAS 223471, immature male, 332 mm TL. Type locality: Ta-Shi Fish Market, Tashi, northeastern Taiwan, 24°53'N, 122°01'E, 9 April 1988.

Local Synonymy: *Torpedo nobiliana*: Chen & Chung, 1971:6, fig. 4; Chen & Joung, 1993: 621, pl. 11, fig. 1; *Torpedo formosa*: Haas & Ebert, 2006: 2, figs. 1-3; Shen & Wu, 2011:90, fig.

Taiwan voucher material: CAS 223471 (Holotype), 332 mm TL, immature male; CAS 223472 (Paratype), 243 mm TL immature male; CAS 223473 (Paratype), 242 mm TL female (all from Da-xi, northeastern Taiwan); NMMBP 2797; NMMBP 6199; NMMBP 6614, 282 mm TL, female; NMMBP 6648; NMMBP, 6649; NMMBP 6650; NMMBP 8131, 300 mm TL, male; NMMBP 9293; NMMBP 11594; NMMBP 15880, 465 mm TL, 540 mm TL, 890 mm TL, all female; NMMBP 16216, 219 mm TL, male.

Remarks: The separation of *Tetronarce formosa* from *T. tokionis* (Tanaka, 1908) and *T. nobiliana* (Bonaparte, 1835), the latter species reported from Taiwan prior to Haas & Ebert (2006), is not straight forward, a circumstance widespread in the systematics of *Tetronarce* (Carvalho *et al.*, 2002). *Tetronarce formosa* resembles *T. tokionis* most, not being as dark or purplish-black dorsally as *T. nobiliana*, but this character is highly variable, as are proportional measurements that depend on the state of preservation of material, which is frequently poor. *Tetronarce formosa* is reported to differ from *T. tokionis* in having a lighter dorsal color without darker hatch markings, disc ovate (longer than wide vs. more circular in *T. tokionis*), a thinner disc, in lacking an emarginated caudal fin (present in *T. tokionis*), and in having a shorter tail (Haas & Ebert, 2006). We follow Haas & Ebert (2006) in recognizing only *T. formosa* and *T. tokionis* from Taiwan. A revision of *Tetronarce* has been in preparation for a while (Carvalho & Séret, in prep.), hindered by the lack of series of well-preserved specimens. The species is occasionally taken as bycatch, but it is of no commercial value.

Conservation status: Data Deficient.

Tetronarce tokionis (Tanaka, 1908)

Japanese pelagic torpedo, Trapezoid torpedo / 東京電鱈

Tetronarcine tokionis Tanaka, 1908: 2, fig. Type locality: Tokyo fish market, Tokyo, Japan. Holotype: ZUMT 917 (apparently lost).

Local Synonymy: *Torpedo tokionis*: Chen & Joung, 1993: 621, pl. 11, fig. 2; Shen & Wu, 2011: 90.

Taiwan voucher material: ASIZP 57914, 200 mm TL, female; ASIZP 62334, 175 mm TL, male; ASIZP 64633, 230 mm TL, female; ASIZP 65468, 240 mm TL, male; ASIZP 66221, 295 mm TL, male; ASIZP 70777, 220 mm TL, male; CAS 235419, 693 mm TL adult male, 24 May 2005; CAS 236519, 184 mm TL immature female, 9 May 1988; CAS236520 (2 spec.), 289 mm TL immature male, 230 mm TL immature female, 20 May 1988 (All material from ASIZP and CAS collected at Da-xi, northeastern Taiwan).

Remarks: To our knowledge, very few specimens of this species are present in Taiwanese collections, even though a poorly preserved specimen possibly of this species is figured in Shen & Wu (2011, p. 90). Most known material of this species is in Japanese collections and is from Japan. Haas & Ebert (2006) mention four specimens collected from the Da-xi, northeastern Taiwan, that they used for comparison with *T. formosa* (three immature and one adult male that are deposited at the CAS). As mentioned above, separation between *T. tokionis* and *T. formosa* is difficult, especially after preservation. The species is commonly reported from adjacent regions (Hatooka, 2013). Infrequently captured as by-catch, but of no commercial importance. It is not as common at the Da-xi market as *T. formosa*.

Conservation status: Data Deficient.

Family Narcinidae Gill, 1862

Numbfishes/ 雙鰭電鱈屬

Genus *Benthobatis* Alcock, 1898

Blindrays/ 深海電鱈屬

Benthobatis Alcock, 1898: 144. Type species: *Benthobatis moresbyi* Alcock, 1898, by monotypy.

Benthobatis yangi Carvalho, Compagno & Ebert, 2003

Narrow blindray / 楊氏深海電鱈

Benthobatis yangi Carvalho, Compagno & Ebert, 2003: 928. Holotype: SIO 70-274, adult male 215 mm TL, off Tungkang, 22°28.0'N, 120°26.0'E, southwestern Taiwan, 30 June 1970.

Local Synonymy: *Benthobatis moresbyi*: Chen & Chung, 1971: 5-6, fig. 3; Shen, 1984a: 5, pl. 5; Shen, 1984b: 40; Chen & Joung, 1993:79, 621, pl. 11, fig. 3. *Benthobatis* sp. 2: Carvalho, 1999a: 252, figs. 4C, 5 and 10. *Benthobatis* sp.: Carvalho *et al.*, 2000: 1438; Compagno, 2000: 581.

Taiwan voucher material: ASIZP 53981, 2 females, 195 and 345 mm TL; ASIZP, 57800, 371 mm TL, female; ASIZP 63155, 330 mm TL, female (all ASIZP material from Da-xi); NMMBP 2083; NMMBP 2767, 343 mm TL, female, Tungkang; NMMBP 4991; NMMBP 11612 (15 spec.), 12 females and 3 males, largest female 301 mm TL, largest male 196 mm TL; NMMBP 16513; NMMBP 16552.

Remarks: An unmistakable, easily identified species, being the only electric ray from Taiwan that is blind, without externally noticeable eyes. Previously recognized as *Benthobatis moresbyi* by Taiwanese ichthyologists.

Conservation status: Vulnerable.

Genus *Narcine* Henle, 1834

Numbfishes/ 雙鰭電鱔屬

Narcine Henle, 1834:31. Type species: *Torpedo brasiliensis* Olfers 1831, by subsequent designation.

***Narcine brevilabiata* Bessednov, 1966**

Shortlipnumbfish / 短唇雙鰭電鱔

Narcine brevilabiata Bessednov, 1966: 81, fig. 8. Type locality: Gulf of Tonkin, South China Sea, 17°30'N, 107°00'E, depth 49 m. Holotype: Mus. Fish. Inst. Vladyvostok 3602 (apparently lost).

Local Synonymy: *Narcine maculata*: Teng, 1962: 188, fig. 47; Chen & Chung, 1971:5; Chen & Joung, 1993:79, 621, pl. 11, fig. 4; Chen, 2004:23.

Taiwan voucher material: NMMBP 6325, Penghu, Aug. 1957; NMMBP 6327, Dong-gang, Nov. 1962.

Remarks: This species is frequently reported from Vietnam (from where it was described; Bessednov, 1966), and is widespread in mostly shallow inshore waters of southeastern Asia (e.g. Liu, 1932, as *N. lingula*). Distinguished by presenting numerous small (smaller than eyes) dark brownish spots over disc, pelvics and tail, with fewer and much larger dark brown spots at pectoral insertions, central and outer pectoral disc region, and at dorsal fin bases, with a small mouth and triangular outline of the exposed tooth band (Carvalho, 1999b). There may be more than one species with roughly these characteristics inhabiting shallow waters of southeastern Asia, and an apparently undescribed form from Indonesia exists (Carvalho, 1999b). This species is not common in Taiwan and is included here on the basis of few individuals and the photographic record in Chen & Joung (1993).

Conservation status: Vulnerable.

***Narcine lingula* Richardson, 1846**

Roughnumb fish / 舌形雙鰭電鱔

Narcine lingula Richardson, 1846: 196. Based on illustration by J. Reeves from specimen from Canton (Guangzhou, China). No type specimens known.

Local synonymy: *Narcine timlei*: Teng, 1962: 190-191, fig. 48; Chen & Chung, 1971:4-5, fig. 2; Chen & Joung, 1993: 79, 621, pl. 11, fig. 5; Chen, 2004:23. *Narcine brevilabiata*: Shen & Wu, 2011: 91, fig. *Narcine lingula*: Chen, 2004: 22.

Taiwan voucher material: AZISP 54478 (2 spec.), 180 mm TL male, 180 mm TL female; AZISP 59864 (7 specs.), 375, 280, 250 mm TL adult or immature females, 385, 347, 283, 245 mm TL adult and immature males, Da-xi; AZISP 70165, 315 mm TL adult female, Da-xi; AZISP 70353 (2 specs.), 355 mm TL adult male, 255 mm TL subadult male, Da-xi; AZISP 70354 (4 specs.), 285 mm TL immature female, 366, 340 and 258 mm TL adult and immature males; CAS 15846; CAS 15918 (4 specs.); CAS 30991; CAS 34208; MCZ 45; NMMBP 6318 (2 spec.), 300 mm TL adult male, 124 mm TL juvenile male, Dong-gang, 3 Apr. 1960; NMMBP 6324 (2 spec.), Kaohsiung,

23 Jan. 1960; NMMBP 6326, Penghu, 17 Jul. 1960; NMMBP 6327, 291 mm TL adult male, Ting-Kang, Nov. 1962; NMMBP 11105, 228 mm TL juvenile male, Nan-fang-ao, 18 Nov. 2009; NMMBP 11615, 335 mm TL adult male; NMMBP 12653 (5 spec.), 326 and 282 mm TL adult males, 3 juveniles, Dong-gnag; NTUM 00006, 223 mm TL, Penghu, 2 Nov. 1961; NTUM 00023, 258 mm TL, Penghu, Oct. 1969; NTUM 01642, 285 mm TL, Nan-fang-ao, 23 Dec. 1972; NTUM 01648, 270 mm TL, Tam-Shui, Taipei, 6 Oct. 1972; NTUM 04454, Da-xi, Oct. 1982; NTUM 04455, 369 mm TL, Da-xi, Oct. 1982; NTUM 05023; USNM 192574 (3 spec.), 200 mm TL, Penghu.

Remarks: Information on the original description, including lack of type material, is from Carvalho (1999b; but see also Whitehead, 1970). Separation of *N. lingula* and *N. maculata* is very difficult and still tentative, representing probably the greatest problem in identifying Indo-Pacific *Narcine* species (Carvalho, 1999b). We have provisionally identified all material from Taiwan fitting the descriptions of *N. lingula* and *N. maculata* as *N. lingula*. Both species are separated by details of nostril and nasal curtain proportions, but these characters may prove insufficient. Previous works on Taiwanese chondrichthyans usually recognize three species of *Narcine*, *N. timlei*, *N. maculata* and *N. lingula*, or a combination of two of these (e.g. Teng, 1962; Chen & Chung, 1971; Chen & Joung, 1993). The former species, which is a small species with a uniform brown color, small eyes and usually a very distinct angular disc shape (Carvalho, 1999b), has been incorrectly identified in all previous accounts, and is not present in Taiwanese collections.

Conservation status: Data Deficient.

Family Narkidae Fowler, 1934

Genus *Narke* Kaup, 1826

Onefin sleeper rays / 單鰭電鱘屬

Narke Kaup, 1826: 88. Type species: *Raja capensis* Gmelin, 1789, by monotypy.

Narke japonica (Temminck & Schlegel, 1850)

Japanese sleeper ray / 日本單鰭電鱘

Torpedo (Astrape) japonica Temminck & Schlegel, 1850: 307, Pl. 140. Lectotype: RMNH D2418 (stuffed), Japan, designated by Boeseman (1947: 224).

Local Synonymy: *Crassinarke dormitor*: Teng, 1962: 193-194, fig. 50; Chen & Chung, 1971: 8-9, fig. 6; Shen, 1984a: 6; Shen, 1984b: 72; Chen & Yu, 1986: 154; Shen & Wu, 2011: 91, fig.; Chen, 2004: 23.

Taiwan voucher material: ASIZP 57917, 240 mm TL, adult male, Dong-Sha Islands, 2 May 1993; ASIZP 60206 (3 spec.), 250 mm TL, adult male, 125 and 142 mm TL, females, Da-xi, 30 Nov. 1997; ASIZP 60258 (3 spec.), 2 juvenile males both 180 mm TL, 190 mm TL, female, Da-xi, 31 Dec. 1998; ASIZP 60259, 220 mm TL, female, Da-xi, 17 Sep. 1998; ASIZP 60564, 225 mm TL, adult male, Da-xi, 10 Arp. 1995; NMMBP 4410, Keelung, 26 Nov. 1961; NMMBP 6197, Da-xi, 8 May 2003; NMMBP 11609, Keelung, 18 Dec. 1960; NMMBP 15618, 175 mm TL, Dong-gang, 10 Aug. 1022; NMMBP 16182, 75 mm TL, Dong-gang, 14 Nov. 2009; NMMBP 16214, 227 mm TL, adult male, Da-xi, 14 Apr. 2012; NMMBP 16215, 152 mm TL, Da-xi, 14 Apr. 2012; NMMBP 16219, 220 mm TL, female; NMMBP 16387, Da-xi, 23 Feb. 2012; NMMBP 16426, 194 mm TL, female, TungKang, 14 Nov. 2009.

Remarks: Teng (1962) first reported *Narke japonica* from Taiwan. Intensity of dorsal coloration and the presence of darker spots at base of dorsal fin or at disc insertions are variable in *N. japonica*. *Narke dipterygia* (Bloch & Schneider, 1801) occurs in the South China Sea off Vietnam and probably off southeastern China as well, just to the southwest of Taiwan, and may eventually be reported from there (we have not found any specimen from

Taiwan). Both of these species of *Narke* are easily distinguished based on bodily proportions and color pattern. *Crassinarke dormitor* Takagi, 1951, is frequently reported from Taiwan and elsewhere in the South China Sea, Taiwan Strait and Sea of Japan. This species is commonly believed to be valid and distinct from *N. japonica* in having a more slender disc and pelvic fins, no real overlap between posterior disc and pelvics, more elongated and slender tail, and slightly darker dorsal color. We note that these features, perhaps excepting the dorsal color, are all indicative of specimens that are poorly preserved and are commonly seen in specimens of many torpediniform species (e.g. Carvalho, 1999b). We have yet to examine well-preserved material (fresh or otherwise) with characters that may separate *N. japonica* and *C. dormitor*, and hence we treat *Crassinarke dormitor* as a junior synonym of *Narke japonica*. A single photo of a more slender, well-preserved specimen of what appears to be *Narke japonica* (the preserved specimen was not found) is presented in Shen & Wu (2011, p. 91) as *Crassinarke dormitor*. Captured as bycatch at least off Dong-gnag and Da-xi, but without commercial importance. As bycatch, *Narke japonica* can be rather common in these markets.

Conservation status: Unknown.

Order Pristiformes

Family Pristidae Bonaparte, 1838

Sawfishes / 鋸鱗科

Genus *Anoxypristis* White & Moy-Thomas, 1941

Knifetooth sawfish / 鋸鱗屬

Anoxypristis White & Moy-Thomas, 1941: 397. Type by being a replacement name for *Oxypristis* Hoffman, 1912, preoccupied by *Oxypristis* Signoret, 1861 in *Hemiptera*.

Anoxypristis cuspidata (Latham, 1794)

Knifetooth sawfish / 鈍鋸鱗

Pristis cuspidatus Latham, 1794: 279, pl. 26 (fig 3). Neotype: MNHN 0000-1250, juvenile female, 810 mm TL, Malabar, India.

Local synonymy: *Pristis cuspidatus*: Nakamura, 1936:44 (1 specimen 1191 mm TL); Teng, 1962:186 (TFRI 2546, female 1130 mm TL, Keelung); Chen & Chung, 1971; 2, fig. 1 (THUP 970, 996 mm TL, Keelung); Shen, 1984a: 71, fig.; Chen & Yu, 1986: 155.

Taiwan voucher material: (1 specimen) FRIP 0898, 486 mm TL, Keelung, 16 Aug 1951.

Remarks: Very rare, with only three confirmed records. H.-C. Yang (pers. comm.) further confirmed the occurrence of this species from Taiwanese waters based on at least one specimen he examined from the 1950's. Local fisherman also confirmed that sawfish was collected from southwestern Taiwan occasionally in early time. The Largetooth Sawfish *Pristis pristis* (Linnaeus) [as *P. microdon* Latham, 1794], Smalltooth Sawfish *Pristis pectinata* Latham, 1794, and Green Sawfish *Pristis zijsron* Bleeker, 1851, have been listed from the South China Sea (e.g. Chu, 1960; Randall & Lim, 2000) but there are no confirmed records from Taiwan.

Conservation status: Critically Endangered.

Order Rajiformes

Family Rhinidae Müller & Henle, 1841

Bowmouth Guitarfish / 鬻頭鱧科

Genus *Rhina* Bloch & Schneider, 1801

Bowmouth Guitarfish / 鬻頭鱧屬

Rhina Bloch & Schneider, 1801: 352. Type designation by indication under ICZN Opinion 6. On official list; *Rhina* Schaeffer, 1760, *Rhina* Walbaum, 1792, and *Rhina* Rafinesque, 1810a placed on Official Index (Opinion 345). Valid as *Rhina* Bloch & Schneider, 1801.

Rhina ancylostoma Bloch & Schneider, 1801

Bowmouth Guitarfish / 波口鬻頭鱧

Rhina ancylostomus Bloch & Schneider, 1801: 352, pl. 72. No type specimens. Lectotype: ZMB (lost), Paralectotypes, ZMB 4621 (1, dry, lost), Coromandel, India.

Local synonymy: *Ramphobatis ancylostomus*: Nakamura, 1936: 46 (1 specimen 617 mm TL). *Rhina ancylostoma*: Teng, 1959f: 2 (TFRI 40, 483 mm TL, Keelung); Teng, 1962:195, fig. 51; Chen & Chung, 1971: 11, fig. 8 (THUP 1021, 2 spec., 504-514 mm TL, Penghu); Shen, 1984a: 71, fig. (NTUM 4308, Keelung); Chen & Yu, 1986:146; Shen, 1988: 24; Chen & Yu, 1986: 146; Chen & Joung, 1993: 71, fig. 9.5; Chen, 2004: 23 (TFRI PB 8107221, 1401 mm TL, Penghu); Shao *et al.*, 2008: 237; Shen & Wu, 2011: 93, fig.

Taiwan voucher material: (6 spec.) ASIZP 57499, 570 mm TL, Nan-fang-ao, 25 Sep. 1995; ASIZP 69357, 1110 mm TL, Da-xi, 10 Mar 2008; FRIP 23718, 1380 mm TL, Cheng-gong, 26 Jun 2012; FRIP 22102, 1560 mm TL, Cheng-gong, 9 Nov. 2006; NMMB-P 4306, Penghu, 17 Jul 1960; NMMB-P 6581, Penghu, 11 Nov. 1960.

Remarks: This species was not uncommon at fish markets around Taiwan during a survey conducted in April to May 1988 by DAE. Several specimens, including juveniles and adults, were observed at the Su-Ao and Keelung fish markets.

Conservation status: Vulnerable.

Family Rhynchobatidae Garman, 1913

Wedgefishes / 龍紋鱧科

Genus *Rhynchobatus* Müller & Henle, 1837a

Wedgefishes / 龍紋鱧屬

Rhynchobatus Müller & Henle, 1837a:116. Type species: *Rhinobatus laevis* Bloch & Schneider, 1801, by monotypy.

Rhynchobatus australiae Whitley, 1939

Whitespotted wedgefish/ 南方龍紋鱧

Rhynchobatus djiddensis australiae Whitley, 1939:245, Fig. 14. Holotype: AMS IA.4959, off Manning River mouth, New South Wales, Australia.

Local synonymy: Not previously recorded. Additional presumed misidentifications of *Rhynchobatus djiddensis* (i.e. Chen, 1956: 24; Chen, 1969: 76; Yang & Chen, 1971: 6; Chen & Yu, 1986: 145; Shao *et al.*, 1994: 277) cannot be accurately ascribed to this or any of the species listed below.

Taiwan voucher material: (1 specimen) HUMZ 109480, Kaohsiung fish market, 16 Apr 1986.

Remarks: Another specimen exists of this species deposited in the Fishery Institute with unconfirmed locality. A revision of the western North Pacific members of this genus is urgently required.

Conservation status: Vulnerable.

***Rhynchobatus palpebratus* Compagno & Last, 2008**

Eyebrow Wedgefish / 瞬眼龍紋鱧

Rhynchobatus palpebratus Compagno & Last, 2008:230, figs. 1–3. Holotype: CSIRO H 3384-01, off Wessel Islands, Arafura Sea, Northern Territory, Australia.

Local synonymy: *Rhynchobatus djiddensis*: Chen & Joung, 1993: 619, fig 9.6; Shao *et al.*, 2008:93, fig.

Taiwan voucher material: (2 spec.) NMMB-P 6294, 544 mm TL, Keelung, 18 Dec 1960; NMMB-P 15663, 535 mm TL.

Remarks: Known from the Indo-Malay Archipelago, from northern Australia to the Andaman Sea. This is a new record for Taiwan.

Conservation status: Not Evaluated.

***Rhynchobatus springeri* Compagno & Last, 2010**

Broadnose Wedgefish / 史氏龍紋鱧

Rhynchobatus springeri Compagno & Last, 2010:79, figs. 1–3. Holotype: RMNH PISC 38539, Jakarta, Java, Indonesia.

Local synonymy: *Rhynchobatus djiddensis*: ?Yang, 1979: 6, fig 5; ?Yang & Chen, 1971:3, fig.

Taiwan voucher material: (2 spec.) NMMB-P 6283, 642 mm TL, Dong-gang, 16 May 1960; NMMB-P 10844, 530 mm TL, Keelung, Feb 2009.

Remarks: A new record for Taiwan, the species was previously known from Indo-Malay Archipelago, from Thailand south to Borneo, Java, Singapore and the Philippines. Unlike other wedgefishes this species appears to venture into more brackish habitats.

Conservation status: Vulnerable.

***Rhynchobatus immaculatus* Last, Ho & Chen, 2013**

Taiwanese Wedgefish / 無斑龍紋鱧

Rhynchobatus immaculatus Last, Ho & Chen, 2013:187, figs. 2–8. Holotype: NMMB-P 16274, juvenile male 730 mm TL, Keelung fish market, 16 Mar 2012.

Local synonymy: Rhynchobatus djiddensis: ?Yang, 1979: 6, fig 5; ?Yang & Chen, 1971:3, fig. *Rhynchobatus immaculatus*: Last *et al.*, 2013.

Taiwan voucher material: Holotype: NMMB-P 16274, juvenile male 730 mm TL, Keelung fish market, 16 Mar 2012. Paratypes (3): CSIRO H 7418–01, juvenile male 890 mm TL, Wu-chi, Taichung County, Taiwan Strait, western Taiwan, ca. 24°18'N, 120°29'E, 21 May 2010; NMMB-P 16135, female 780 mm TL, Keelung fish market, 9 Mar 2012; NMMB-P 16275 (tissue accession GN10067), female 740 mm TL, Keelung fish market, 16 Mar 2012. Six additional non-type specimens are listed in Last *et al.* (2013).

Remarks: Newly discovered and described in this issue, possibly endemic to the seas around Taiwan.

Conservation status: Not Evaluated.

Family Rhinobatidae Müller & Henle, 1837

Guitarfishes / 琵琶鱗科

Genus *Glaucostegus* Bonaparte, 1846

Spiny Guitarfishes / 棘琵琶鱗屬

Glaucostegus Bonaparte, 1846: 14. Type species: *Rhina cemiculus* Geoffroy St. Hillaire, 1817, by subsequent designation.

?*Glaucostegus granulatus* (Cuvier, 1829)

Giant Guitarfish / 顆粒棘琵琶鱗

Rhinobatus granulatus Cuvier, 1829: 396. Syntypes: MNHN 0000-1253 (female 425 mm TL) & MNHN 0000-1254 (female 310 mm TL), Coromandel, Pondicherry, India.

Local synonymy: Scobatus granulatus: Shen, 1988: 5.

Taiwan voucher material: (1 specimen) NTUM 03789, 1 specimen from Ma-gung (Shen, 1988).

Remarks: Shen (1988) listed a specimen (NTUM 03789) only, but we could not find it during the 2012 survey. Chu (1960) listed 4 specimens 540–865 mm TL from off the mainland of China with catalogue numbers, but these specimens could not be confirmed as *G. granulatus*. We could find no confirmed records of *G. granulatus* from the Pacific as all specimens purported to be this species were found to be a misidentification of *G. typus* (Bennett, 1830), a species that does appear to in this region. The issue is currently under investigation by PRL and BS.

Conservation status: Vulnerable.

?*Glaucostegus microphthalmus* (Teng, 1959f)

Smalleyed Guitarfish / 小眼琵琶鱗

Rhinobatos microphthalmus Teng, 1959f: 10. Holotype: TFRI 3089, female 1215 mm TL, from Keelung, Taiwan, 17 March 1957.

Local synonymy: Rhinobatos microphthalmus: Chen, 1948: 24, 35; Teng, 1959f: 11, 90, fig. 6, pl. II, fig. 6; Chen & Chung, 1971: 15; Chen & Joung, 1993: 73; Chen, 2004: 24; Ho & Shao, 2011: 20.

Taiwan voucher material: Holotype: TFRI 3089 (lost). No additional material was examined during the 2012 survey.

Remarks: The type specimen for this species was collected at the Keelung, but it could have been landed from outside Taiwanese waters since a second specimen of this species from Vietnam was landed at Kaohsiung according to H.-C. Yang (pers. comm.). This species is possibly a synonym of *G. typus*.

Conservation status: Data Deficient.

***Rhinobatos formosensis* Norman, 1926**

Taiwan Guitarfish / 台灣琵琶鱗

Rhinobatos formosensis Norman, 1926: 4. Syntypes, BMNH 1862.12.6.69-70 (2, 625–630 mm TL), Taiwan.

Local synonymy: *Rhinobatos formosensis*: Norman, 1926: 4; Fowler, 1941:307; Chen, 1948: 24, 35; Teng, 1959f: 7, fig. 3, pl. I, fig. 3 (TFRI 2565, male, 556 mm, Keelung); Chen & Chung, 1971: 12, fig. 9 (THUP 11847, 3 spec., 377-645 mm, Taichong); Shen, 1988: 5 (NTUM 6680, Ta-Sahi, NTUM 6802, Penghu); Chen & Joung, 1993: 72, fig. 7; Chen, 2004: 23; Shao *et al.*, 2008: 237; Ho & Shao, 2011: 21.

Taiwan voucher material: TFRI 2565, male, 556 mm, Keelung. No additional material was examined during the 2012 survey. Several specimens from the NMMB collection were provisionally identified as *R. formosensis* during the 2012 survey, but their morphometrics and meristics appear to fit within the range of variation of *R. schlegelii*.

Remarks: The taxonomic status of this species is currently under investigation, but it is likely to be a junior synonym of *Rhinobatos schlegelii* Müller & Henle, 1841.

Conservation status: Data Deficient.

***Rhinobatos hynnicephalus* Richardson, 1846**

Ringstraked Guitarfish / 斑紋琵琶鱗

Rhinobatus hynnicephalus Richardson, 1846, *Rep. Brit. Ass. Adv. Sci.* 15th meeting. No types known. China seas.

Local synonymy: *Rhinobatus polyophthalmus*: Nakamura, 1936: 48. *Rhinobatos hynnicephalus*: Chen, 1948: 25, 36; Teng, 1959f: 10, 90, fig. 5, pl. II, fig. 6 (TFRI 2761, male 458 mm TK, Keelung); Chen & Chung, 1971: 14, fig. 11 (THUP 469, 4 spec., 425-534 mm TL, Tai-Chong); Shen, 1988: 5 (NTUM 36, 2 spec., Ma-Kung); Chen & Joung, 1993: 73, fig. 8; Chen, 2004: 24 (TFRI PB 8302272, Peng-Hu); Shao *et al.*, 2008: 237.

Taiwan voucher material: Four specimens from THUP, now in the NMMB (Accession numbers 6483 & 6494) and 16 specimens (395–650 mm TL) collected in 2011 now in the NMMB collections. NMMB-P uncatalogued (tissue accession GN10242), NMMB-P uncatalogued (tissue accession GN10243), NMMB-P uncatalogued (tissue accession GN10244), Da-xi, 23 Oct 2011.

Remarks: Specimens in preservative often lose their distinctive markings leading to confusion with *R. schlegelii*.

Conservation status: Near Threatened.

***Rhinobatos schlegelii* Müller & Henle, 1841**

Brown Guitarfish / 薛氏琵琶鱗

Rhinobatos schlegelii Müller & Henle, 1841: 123, pl. 42. Lectotype: RMNH D2680 (dry), Paralectotypes (8 including 6 dry and 2 in alcohol) RMNH D2681, D2684–2687, D2689 and 4225; Japan.

Local synonymy: *Rhinobatos schlegelii*: Günther, 1870: 446; Jordan & Evermann, 1902: 318; Fowler, 1941:308; Chen, 1948: 24 & 36; Teng, 1959f: 8, 89, fig. 4, pl. II, fig.4 (TFRI 2507, female 466 mm TL, Keelung); Chen & Chung, 1971: 13, fig. 10 (THUP 145, 7 spec. 233-442 mm, Penghu); Shen, 1988: 407 (NTUM 6681, Ta-Shi); Chen & Joung, 1993: 73, fig. 8; Chen, 2004: 24 (THUP PB 8105055, 589 mm TL).

Taiwan voucher material: AMNH 258309 (tissue accession GN10039), adult male 646 mm TL, Da-xi, 14 Mar 2012; NMMB-P uncatalogued (tissue accession GN10256), NMMB-P uncatalogued (tissue accession GN10257), NMMB-P uncatalogued (tissue accession GN10252), Da-xi, 23 Oct 2011. In addition, one of us (BS) examined about 25 specimens from the NMMB collections.

Remarks: The status of the Taiwanese *Rhinobatos schlegelii* is under revision by BS and PRL.

Conservation status: Data Deficient.

Family Platyrhinidae Muller & Henle, 1838a

Thornback Rays / 團扇鱈科

Genus *Platyrhina* Muller & Henle, 1838a

Thornback Fanrays / 團扇鱈屬

Platyrhina Muller & Henle, 1838a: 90. Type species: *Raja sinensis* Bloch & Schneider, 1801, by original designation.

***Platyrhina tangi* Iwatsuki, Zhang & Nakaya, 2011**

Amoy fanray / 湯氏黃點鮠

Platyrhina tangi Iwatsuki, Zhang, & Nakaya in Iwatsuki, Miyamoto, Nakaya & Zhang 2011:37, Figs. 2C-D, 3D-F, Meitsu, Miyazaki, Japan, 31°32'12"N, 131°24'16"E. Holotype: MUFS 23163.

Local synonymy: *Discobatus sinensis*: Cheng, 1955: 30, fig. 21. *Platyrhina sinensis*: Teng, 1962: 207, fig. 57; Chu & Wu, 1984: 63, fig. 35; Shen, 1984b: 4, fig. 8-1; Chen & Yu, 1986: 147; Chen & Joung, 1993: 74, pl. 9-10. *Platyrhina tangi*: Iwatsuki *et al.*, 2011: 37, figs 2C-D, 3D-F; Shen & Wu, 2011: 99, fig.

Taiwan voucher material: (17 spec.) NMMB-P 6190, Da-xi, 8 May 2003; NMMB-P 8966, Penghu, 27 Oct 2005; NMMB-P 9027, Penghu, 27 Oct 2005; CAS 235417, female 506 mm TL, CSIRO H 6292-18, adult male 415 mm TL, Da-xi, 21 May 2005; UF 159203, adult male 358 mm TL, Da-xi, 24 May 2005; CSIRO H 6296-07, juvenile female 273 mm TL, UF 159697, female 271 mm TL, Da-xi, 25 May 2005; AMNH 258308 (tissue accession GN10032), adolescent male 351 mm TL, CSIRO H 7395-13 (tissue accession GN10028), female 373 mm TL, CSIRO H 7395-14, female 365 mm TL, HUMZ 213848 (tissue accession GN10033), female 378 mm TL, HUMZ 213849 (tissue accession GN10034), female 530 mm TL, HUMZ 213850 (tissue accession GN10035), female 445 mm TL, MNHN 2013-0473 (tissue accession GN10030), female 389 mm TL, MNHN 2013-0474 (tissue accession GN10031), adult male 386 mm TL, Da-xi, 14 Mar 2012; CSIRO H 7396-03, female 157 mm TL, Nan-fang-ao, 14 Mar 2012.

Remarks: Common. This species is distributed from northern Vietnam to Korea, Taiwan and Pacific coast of southern Japan. Until recently this species was thought to be *Platyrhina sinensis* (Bloch & Schneider, 1801), but is now known to be a distinctly different species.

Conservation status: Data Deficient.

Family Arhynchobatidae Fowler, 1934

Softnose Skates / 長尾鯊科

Genus *Bathyraja* Ishiyama, 1958

Softnose Skates / 深海鯊屬

Bathyraja (subgenus of *Breviraja*) Ishiyama, 1958: 325. Type species: *Raja isotrachys* Günther, 1877, by original designation.

***Bathyraja trachouros* (Ishiyama, 1958)**

Eremo Skate / 糙體深海鯊

Breviraja (*Arctoraja*) *trachouros* Ishiyama, 1958: 329, fig. 62. Holotype: FAKU 49464, adult male 900 mm TL, off Erimo Peninsula, Hokkaido, Japan.

Local synonymy: *Bathyraja trachouros*: Hsu & Joung, 2004: 187, fig. 5.

Taiwan voucher material: EBFS 09050201, female 344 mm DW, Da-xi, Jan 2004.

Remarks: Based on a single specimen first reported by Hsu & Joung (2004), however, another specimen (ASIZP 63854), listed by Shao *et al.* (2008) as *B. isotrachys*, is probably this species.

Conservation status: Least Concern.

Genus *Notoraja* Ishiyama, 1958

Velvet Skates / 隆背鯊屬

Notoraja (subgenus of *Breviraja*) Ishiyama, 1958: 322. Type species: *Raja tobitukai* Hiyama, 1940, by original designation (also monotypic).

***Notoraja tobitukai* (Hiyama, 1940)**

Leadhue Skate / 日本隆背鯊

Raja tobitukai Hiyama, 1940: 169, fig. 1. Holotype (unique): FUMT P1558, Kumano-Nada, Japan.

Local synonymy: *Notoraja tobitukai*: Nakabo, 2002: 168; Shao *et al.*, 2008: 237.

Taiwan voucher material: (2 spec.) CAS 235281, female 432 mm TL, Da-xi, 24 May 2005; ASIZP 66925, female 314 mm TL, South China Sea, 7 Mar. 2006.

Remarks: Japanese and Taiwanese populations need to be compared carefully using morphological and molecular techniques.

Conservation status: Data Deficient.

Family Rajidae Blainville, 1816

Hardnose Skates / 鰩科

Genus *Dipturus* Rafinesque, 1810a

Longnosed Skates / 長吻鰩屬

Dipturus Rafinesque, 1810a: 16. Type species: *Raja batis* Linnaeus, 1758, by monotypy.

***Dipturus gigas* (Ishiyama, 1958b)**

Giant Skate / 巨長吻鰩

Raja (Tengujei) gigas Ishiyama, 1958b: 386, figs. 84, 86. Holotype: FUMT P1558, adult male 1345 mm TL, off Aichi Prefecture, Kumano-nada, Japan.

Local synonymy: New record for Taiwan.

Taiwan voucher material: (3 spec.) CSIRO H 7395-15 (tissue accession GN9998), female 299 mm TL, Da-xi, 14 Mar 2012; NMMB-P HO-316, Da-xi, 15 Apr 2012; NMMB-P HO-346, Da-xi, 5 May 2012.

Remarks: One of us (DAE) observed this species infrequently at the Da-xi during a survey in May 1988 (identification confirmed by H. Ishihara). Frequently confused with *D. macrocauda*, particularly at juvenile stages.

Conservation status: Data Deficient.

***Dipturus kwangtungensis* (Chu, 1960)**

Kwangtung Skate / 廣東長吻鰩

Raja kwangtungensis Chu, 1960: 148, figs. 137–139. Holotype: SFI 57-0676, juvenile male 336 mm TL, Jia-Bo, East China Sea, China.

Local synonymy: *Raja kenojei* (not of Muller & Henle): Teng, 1962: 211; Chen & Chung, 1971: 20, fig. 14; Shen, 1984a: 74, fig.; Shen, 1984b: 6, pls 10-1, a, b; Chen & Yu, 1986: 149; Okada *et al.*, 1935:59; Ishiyama, 1958a: 14. *Raja (Dipturus) kwangtungensis*: Chen & Joung, 1989: 3-4, fig. 1; Chen & Joung, 1993: 75, pl. 10 (fig. 1). *Dipturus kwangtungensis*: Shao *et al.*, 2008: 237. *Dipturus kwangtungensis*: Shen & Wu, 2011: 96, fig.

Taiwan voucher material: (23 spec.) CSIRO H 7394-11, adult male 626 mm TL, CSIRO H 7394-12 (tissue accession GN9928), female 753 mm TL, HUMZ 213840 (tissue accession GN9931), adult male 600 mm TL, MNHN 2013-0479 (tissue accession GN9929), female 610 mm TL, MNHN 2013-0480 (tissue accession GN9930), adult male 613 mm TL, Da-xi, 13 Mar 2012; CSIRO H 7395-17, juvenile male 232 mm TL, CSIRO H 7395-18, female, CSIRO H 7395-19, 240 mm TL, CSIRO H 7395-20, female 263 mm TL, CSIRO H 7395-21, juvenile male 301 mm TL, CSIRO H 7395-22 (tissue accession GN9999), female 497 mm TL, CSIRO H 7395-23 (tissue accession GN10000), juvenile male 419 mm TL, MNHN 2013-0488 (tissue accession GN10001), juvenile male 304 mm TL, MNHN 2013-0489 (tissue accession GN10002), female 245 mm TL, Da-xi, 14 Mar 2012; CSIRO H 7396-04, juvenile male 180 mm TL, Nan-fang-ao, 14 Mar 2012; CSIRO H 7398-05, female, CSIRO H 7398-06,

juvenile male, CSIRO H 7398-07, juvenile male, 22°26' N, 120°30' E, Dong-gang, 18 Mar 2012; CSIRO H 7401-07, juvenile male, 22°26' N, 120°30' E, Dong-gang, 19 Mar 2012; CSIRO H 7402-02, juvenile male 430 mm TL, CSIRO H 7402-04 (3 spec.), 22°26' N, 120°30' E, Dong-gang, 20 Mar 2012.

Remarks: The literature has continually mixed this species with *O. kenojei* and *O. meerdervoortii*. A re-examination of type material and redefinition of these taxa is needed to resolve this nomenclatural confusion.

Conservation status: Data Deficient.

***Dipturus macrocauda* (Ishiyama, 1955)**

Bigtail Skate / 巨尾長吻鱈

Raja macrocauda Ishiyama, 1955: 43, figs 1–2. Holotype: male 997 mm, Miya fish market, Aichi Prefecture, Japan, 19 Mar 1952; whereabouts not verified.

Local synonymy: *Raja (Dipturus) macrocauda*: Chen & Joung, 1989:6, fig. 3. *Raja (Dipturus) macrocauda*: Chen & Joung, 1993: 75, pl. 10 (fig. 2); *Dipturus macrocauda*: Shen & Wu, 2011: 97, fig.

Taiwan voucher material: (1 specimen) CAS 235421, Da-xi, 25 May 2005; CSIRO H 7397-02 (tissue accession GN10090), female 195 mm TL, Da-xi, 15 Mar 2012.

Remarks: A single specimen was collected at the landing ground of Da-xi by DAE and WTW in May 2005. This species was infrequently observed at the Da-xi by one of us (DAE) during a survey in April-May 1988. It was typically taken at depths below 300 m.

Conservation status: Data Deficient.

***Dipturus tengu* (Jordan & Fowler, 1903)**

Acutenose Skate / 天狗長吻鱈

Raja tengu Jordan & Fowler, 1903: 654, fig. 8. Holotype: SU 12912 (specimen bisected), Matsushima Bay, Sndai, Japan.

Local synonymy: *Raja tengu*: Chen & Chung, 1971: 18, fig. 13; Shen, 1984a: 74; Yu, 1988: 9. *Raja (Dipturus) tengu*: Chen & Joung, 1989: 5-6, fig. 2; Chen & Joung, 1993: 75, pl. 10 (fig. 3). *Dipturus tengu*: Chen, 2004: 24; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 97, fig.

Taiwan voucher material: (9 spec.) CAS 236051 (tissue accession GN10109), female 407 mm TL, Dong-gang, Mar 2012; AMNH 258306 (tissue accession GN10127), female 284 mm TL, MNHN 2013-0482 (tissue accession GN10128), female 198 mm TL; NMMB-PHO-242 (tissue accession GN10129), adult male 1051 mm TL, 22°26' N, 120°30' E, Dong-gang, 19 Mar 2012; CSIRO H 7402-03 (tissue accession GN10151), juvenile male 500 mm TL; NMMB-P HO-265 (tissue accession GN10152), female 198 mm TL, MNHN 2013-0483 (tissue accession GN10153), juvenile male 210 mm TL, Dong-gang, 20 Mar 2012; MNHN 2013-0484, juvenile male, MNHN 2013-0485, female, off Kaohsiung, 320 m depth, 21 Mar 2012. Drawing in Chen & Chung (1971) is of THUP 02668 (as *Raja tengu*), specimen location not verified.

Remarks: Frequently confused with *D. gigas*. These species need to be further investigated and redescribed.

Conservation status: Data Deficient.

***Dipturus wuhanlingi* Jeong & Nakabo, 2008**

Wuhanling Skate / 伍氏長吻鱈

Dipturus wuhanlingi Jeong & Nakabo, 2008: 184, figs 1-7. Holotype: SFC D 01113, juvenile male 668 mm TL, southern East China Sea, Apr 1961.

Local synonymy: New record for Taiwan.

Taiwan voucher material: No specimens examined during the present survey.

Remarks: One of us (DAE) along with H. Ishihara has observed specimens at the Da-xi . Presence in the region needs confirmation as more than one species with this thorn distribution exists in the region.

Conservation status: Data Deficient.

Genus *Okamejei* Ishiyama, 1958b

Spiny Rasp Skates / 甕鱈屬

Okamejei (subgenus of *Raja*) Ishiyama, 1958b: 354. Type species: *Raja fusca* Garman, 1885, by original designation.

***Okamejei acutispina* (Ishiyama, 1958b)**

Sharp-spine Skate / 尖棘甕鱈

Raja (Okamejei) acutispina Ishiyama, 1958b: 358, pl. 2 N, fig. 74. Holotype: 413 mm TL, off Shimane Prefecture, Sea of Japan, 3 Dec 1952; whereabouts unknown.

Local synonymy: *Raja acutispina*: Chen & Chung, 1971: 24, fig. 18 (THUP2150); Chen & Yu, 1986: 151. *Raja (Okamejei) acutispina*: Chen & Joung, 1989: 6-7, fig. 4; Chen & Joung, 1993: 76, pl. 10 (fig. 4). *Okamejei acutispina*: Shao *et al.*, 2008: 237; Shen & Wu, 2011: 95.

Taiwan voucher material: (9 spec.) CSIRO H 7394-13 (tissue accession GN9962), adult male 358 mm TL, CSIRO H 7394-14 (tissue accession GN9963), adult male 368 mm TL, HUMZ 213844 (tissue accession GN9966), adult male 424 mm TL, MNHN 2013-0486 (tissue accession GN9964), adolescent male 355 mm TL, MNHN 2013-0487 (tissue accession GN9965), female 429 mm TL, Da-xi, 13 Mar 2012; HUMZ 213845 (tissue accession GN9997), female 445 mm TL, CSIRO H 7395-16 (egg case from HUMZ 213845), CSIRO H 7395-24 (tissue accession GN9996), juvenile male 252 mm TL, Da-xi, 14 Mar 2012; CSIRO H 7396-04, female 175 mm TL, Nan-fang-ao, 14 Mar 2012. A large number of specimens of this species were recently collected and deposited in the NMMP-P fish collection.

Remarks: A common species in Taiwan, but possibly representing a species complex within the region. More work is needed to understand the extent of local variations.

Conservation status: Data Deficient.

***Okamejei boesemani* (Ishihara, 1987)**

Black Sand Skate / 鮑氏甕鱈

Raja (Okamejei) boesemani Ishihara, 1987: 248, fig. 6. Holotype: MTUF-P 25916, adult male 468.5 mm TL, East China Sea, 32°15' N, 125°05' E, 25 May 1950.

Local synonymy: *Raja hollandi* (not of Jordan & Richardson, 1909): Chu, 1960:141; *Chu et al.*, 1963: 58; Chen & Chung, 1971: 22, fig. 15; Chen & Joung, 1989: 8, fig. 5 (8 spec.); Shen, 1984a: 74, fig. *Okamejei boesemani*: Chen, 2004: 24; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 95, fig. *Raja (Okamejei) boesemani*: Chen & Joung, 1993: 76: pl. 10 (fig. 5).

Taiwan voucher material: More recently, a large amount of specimens have been collected from off SW Taiwan from fish markets and deposited at NMMB-P collection. These specimens need to be closely examined.

Remarks: Drawing in Chen & Chung (1971) is of THUP 03138 (as *Raja hollandi*), but the specimen location could not be verified. This species may possibly represent a species complex in the region.

Conservation status: Data Deficient.

Okamejei hollandi (Jordan & Richardson, 1909)

Yellow-spotted Skate / 何氏甕鯧

Raja boesemani Jordan & Richardson, 1909: 163, pl. 64. Holotype: FMNH 52101, adult female 412 mm TL, Takao, Kaohsiung, Taiwan, 1906.

Local synonymy: *Raja hollandi*: Jordan & Richardson, 1909: 163, pl. 64; Fowler, 1941:370; Chen, 1948: 2; Chen & Yu, 1986: 150. *Raja hollandi*: Garman, 1913: 351. *Raja (Okamejei) hollandi*: Chen & Joung, 1989: 8-9, fig. 6; Ishihara, 1987: 256, figs 12, 15; Chen & Joung, 1993: 76, pl. 10 (fig. 6); *Raja olseni* (not of Bigelow & Schroeder, 1951): Chen & Chung, 1971:23; Shen, 1984a: 74. *Raja tengu* (not of Jordan & Fowler, 1903); Shen, 1984b: 6. *Okamejei hollandi*: Chen, 2004: 24; Shao *et al.*, 2008: 237; Ho & Shao, 2011: 20; Shen & Wu, 2011: 96, fig.

Taiwan voucher material: (3 spec.) FMNH 52101 (holotype), adult female 412 mm TL, Kaohsiung, 1906; HUMZ 213846 (tissue accession GN10110), female 370 mm TL, Dong-gang, 18 Mar 2012; AMNH 258307 (tissue accession GN10108), female 416 mm TL, Dong-gang, Mar 2012. A large number of specimens of this species were recently collected and deposited in the NMMB-P collection.

Remarks: Distinctive skate with a thin tail and long interdorsal distance.

Conservation status: Data Deficient.

Okamejei kenojei (Müller & Henle, 1841)

Spiny Skate / 斑甕鯧

Raja kenojei Müller & Henle, 1841: 149, pl. 48. Lectotype (stuffed): RMNH D2499, juvenile female 370 mm TL, Nagasaki fish market, Japan.

Local synonymy: This species is often confused with *Dipturus kwangtungensis* so the synonymy below should be treated with caution. *Raja porosa*: Koo, 1933:18; Chen, 1948: 4, fig. 3; Chang *et al.* 1955: 32; Shen, 1984a: 74, fig. *Raja kenojei*: Chen, 1948: 5, fig. 4; Chen & Chung, 1971: 20, fig. 14 (NTUM 63, 413 mm TL); Yu, 1988: 9. *Raja porosa porosa*: Teng, 1962: 212; Chen & Chung, 1971: 25; Chen & Yu, 1986: 151. *Raja (Okamejei) kenojei*: Chen & Joung, 1989: 9-10, fig. 7; Chen & Joung, 1993: 76, pl. 10 (fig. 7). *Raja (Okamejei) porosa*: Ishiyama, 1967: 19. *Dipturus kenojei*: Chen, 2004: 24. *Okamejei kenojei*: Shao *et al.*, 2008: 237; Shen & Wu, 2011: 96, fig. *Raja fusca*: Chen & Chung, 1971: 19 (NTUM 63, 413 mm TL); Shen, 1984a: 74, fig.; Chen & Yu, 1986: 150. *Raja katsukii* Chang *et al.*, 1955: 34.

Taiwan voucher material: A large number of specimens of this species were recently collected and deposited in the NMMB-P collection.

Remarks: Contention exists about the status of this species in Taiwan. Needs further investigation of the type, a stuffed specimen to confirm its identity and a re-evaluation of the whole synonymy.

Conservation status: Data Deficient.

***Okamejei meerdervoortii* (Bleeker, 1860)**

Bigeye Skate / 麥氏甕鯧

Raja meerdervoortii Bleeker, 1860b: 66. Holotype: RMNH 7432, adult male, 320 mm TL, Nagasaki, Japan.

Local synonymy: *Raja macrophthalma*: Ishiyama, 1950: 35; Chen & Chung, 1971: 22, fig. 16 (THUP 3558, misidentified of *O. kenoei*). *Okamejei meerdervoortii*: Shao *et al.*, 2008: 237; Shen & Wu, 2011: 96, fig.; *Raja (Okamejei) meerdervoortii*: Ishiyama, 1958b: 363; 1967:16; Chen & Joung, 1989: 10-11, fig. 8; Chen & Joung, 1993: 76, pl. 10 (fig. 8).

Taiwan voucher material: A drawing of *Raja macrophthalmus* in Chen & Chung (1971) is of a specimen (THUP 3558) that may be this species, but the specimen could not be located to verify its identification.

Remarks: Status of this species in Taiwan and its relationship to the Japanese skate, *O. macrophthalma*, needs to be clarified. All of the specimens identified as *O. meerdervoortii* that we could find were actually misidentifications of *O. kenoei*. We could find no confirmed records of this species from Taiwanese waters.

Conservation status: Data Deficient.

Family Anacanthobatidae von Bonde & Swart, 1923

Legskates / 無鰭鯧科

Genus *Sinobatis* Hulley, 1973

Legskates / 華鯧屬

Sinobatis (subgenus of *Anacanthobatis*) Hulley, 1973: 153. Type species: *Anacanthobatis borneensis*, Chan, 1965, by original designation (also monotypic).

***Sinobatis borneensis* (Chan, 1965)**

Borneo Legskate / 婆羅洲華鯧

Anacanthobatis borneensis Chan, 1965: 47, figs 1 and 2. Holotype: BMNH 1965.1.29.1, Kuching, Sarawak state, Borneo, East Malaysia, 6°01.8' N, 109°57.4' E, 450–456 fathoms depth.

Local synonymy: *Anacanthobatis borneensis*: Shen, 1988: 6 (NTUM 6598, 5 specimens, Dong-gang; Chen & Joung, 1993: 77, pl. 10.9; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 95, fig.

Taiwan voucher material: ASIZP 57918 (2 spec.), 290-310 mm TL, Dong-Sha Island, 1 May 1993; ASIZP 61591 (4 spec.), Dong-Sha Island, 1 May 1993; ASIZP 63156, 250 mm SL, Da-xi, 29 Sep. 2003; ASIZP 63157, 270 mm SL, Da-xi, 29 Sep. 2003; ASIZP 64237, 106 mm TL, off Dong-gang, 29 May 2003; ASIZP 65482, 202 mm TL, Dong-gang, 31 Aug. 2003; FRIP 43 (2 spec.), 247-269 mm TL, Da-xi, 8 Nov. 1989; FRIP 56, 110 mm TL,

2210.8'N, 12027.9'E, 30 July 2000; NTUM 6598 (5 spec.), Dong-gang, 12 Dec. 1978; NMMB-P 4839 (2 spec.), Dong-gang, 1 Apr. 1965; 8 specimens (75–245 mm TL) from Ocean Research I cruise, November 2001 (Séret collection).

Remarks: This rare species is known from about 20 specimens that have been landed in Taiwan; no additional specimens were recorded during the 2012 survey.

Conservation status: Least Concern.

***Sinobatis melanosoma* (Chan, 1965)**

Blackbodied Legskate / 黑身華鯨

Springeria melanosoma Chan, 1965: 40, figs 1–2. Holotype: USNM 198121, South China Sea, about 170 miles south of Hong Kong, 19°20' N, 114°13' to 16' E, 500–530 fathoms depth.

Local synonymy: *Springeria melanosoma*: Chen & Chung, 1971: 26, fig. 19 (THUP 03548, 6 spec. 137–294 mm TL, Tung-Kang); Shen, 1984a: 74, fig.; Chen & Yu, 1986: 151; Shen, 1988: 6 (NTUM 6678, 2 spec., Tung-Kang); Chen & Joung, 1993: 77, pl. 10.10. *Anacanthobatis melanosoma*: Shao *et al.*, 2008: 237. *Sinobatis melanosoma*: Shen & Wu, 2011: 97, fig.

Taiwan voucher material: No specimens examine in this study.

Remarks: This rare deep-sea legged-skate was not observed during the 2012 survey, but is occasionally observed at fish markets around Taiwan.

Conservation status: Least Concern.

Order Myliobatiformes

Family Plesiobatidae Nishida, 1990

Giant Stingaree / 深水尾魴屬

Genus *Plesiobatis* Nishida, 1990

Giant Stingaree / 深水尾魴屬

Plesiobatis Nishida, 1990: 98. Type by original designation (also monotypic).

***Plesiobatis daviesi* (Wallace, 1967)**

Giant Stingaree / 達氏深水尾魴

Urotrygon daviesi Wallace, 1967: 8, figs 3–4. Holotype: SAIAB 7861 (ex. ORI B865), Mozambique Channel, Limpopo River estuary, South Africa, 922 mm DW, 1717 mm TL, 25°25' S, 33°35' E, 430–439 m depth.

Local synonymy: *Urotrygon mundus*: Chen & Chung, 1971: 28, fig. 20; Shen, 1984a: 77, fig.; Chen & Yu, 1986: 157; Chen & Joung, 1993: 86, pl. 12.9; Chen, 2004: 24. *Plesiobatis daviesi*: Shen & Wu, 2011: 100, fig.

Taiwan voucher material: (7 spec.) CAS 235431, juvenile male 778 mm TL, Da-xi, 23 May 2005; MNHN 2013-0475 (tissue accession GN10107), female 535 mm TL, Dong-gang, Mar 2012; AMNH 258304 (tissue accession

GN10118), female 514 mm TL, Dong-gang, 19 Mar 2012; HUMZ 213851, juvenile male 487 mm TL, Dong-gang, 20 Mar 2012; MNHN 2013-0476 (tissue accession GN10182), juvenile male 463 mm TL), NMMB-P HO-296, female 968 mm TL; NMMB-P HO-297 female 1325 mm TL, off Kaohsiung, 22°32'N, 120°07'E, 320 m depth, 21 Mar 2012.

Remarks: This species has become more common in fish markets as local fisheries have moved into deeper water. *Urolophus marmoratus* Chu, Hu & Li in Chu, Meng, Hu & Li, 1981, from the South China Sea is a junior synonym of this species (White & Last, 2013).

Conservation status: Least Concern.

Family Hexatrygonidae Heemstra & Smith, 1980

Sixgill Stingray / 六鰓魟科

Genus *Hexatrygon* Heemstra & Smith, 1980

Sixgill Stingray / 六鰓魟屬

Hexatrygon Heemstra & Smith, 1980: 1. Type by original designation (also monotypic).

***Hexatrygon bickelli* Heemstra & Smith, 1980**

Sixgill Stingray / 比氏六鰓魟

Hexatrygon bickelli Heemstra & Smith, 1980: 6, figs 1–13, 15. Holotype: SAIAB [formerly RUSI] 997, juvenile or near-adolescent female 1030 mm TL, 500 mm DW, washed up on beach at Port Elizabeth, South Africa, southwestern Indian Ocean, ca. 33°59.5' S, 25°40.7' E.

Local synonymy: *Hexatrygon yangi*: Shen & Liu, 1984: 201, figs 1–11 (NTUM 6100, holotype, 1040 mm TL); Chen & Yu, 1986: 165; Chen & Joung, 1993: 82, pl. 11.9; Shen & Wu, 2011: 100, fig. *Hexatrygon brevirostra*: Shen, 1986a: 106, figs. 1–3 (NTUM 6597, 621.4 mm TL); Chen & Joung, 1993: 81, pl. 11.7; Shen & Wu, 2011: 99, fig. *Hexatrygon taiwanensis*: Shen, 1986b: 175, figs. 1–5 (NTUM 6505, 582 mm TL); Chen & Joung, 1993: 81, pl. 11.8; Shen & Wu, 2011: 99, fig. *Hexatrygon bickelli*: Shao *et al.*, 2008: 237; Ho & Shao, 2011: 20.

Taiwan voucher material: (8 spec.) CAS 235428, juvenile female 958 mm TL, Da-xi, 22 May 2005; CSIRO H 6292-19, juvenile male 716 mm TL, Da-xi, 21 May 2005; UF 158752, juvenile male 546 mm TL, Da-xi, 25 May 2005; NMMB-P HO-243, female 1176 mm TL, Dong-gang, 19 Mar 2012.

Remarks: The ontogenetic changes and variations of snout length and shape with growth in this species caused the description of several species, but all are now considered as synonymous of *H. bickelli*.

Conservation status: Least Concern.

Family Urolophidae Müller & Henle, 1841

Stingarees / 扁魟科

Genus *Urolophus* Müller & Henle, 1837a

Stingarees / 扁魟屬

Urolophus Müller & Henle, 1837a: 117. Type species: *Raja cruciata* Lacepède, 1804, by original designation.

***Urolophus aurantiacus* Müller & Henle, 1841**

Sepia Stingray / 黃扁魷

Urolophus aurantiacus Müller & Henle, 1841: 173, pl. 56 (right). Syntype: ZMB 7584, Gotto Island, Nagasaki, Japan. The 3 other syntypes (MNHN 0000-2602, 0000-2603, 0000-2352) are from southeastern Australia (Port Western, Victoria and Tasmania) and actually represent *Urolophus cruciatus* Lacepède, 1804; to add further confusion, one of these syntypes (MNHN 0000-2352) is also the holotype of *U. cruciatus*; the type locality provided in the original description of *U. aurantiacus* is Gotto Island, thus ZMB 7584 should be considered the lectotype of this species.

Local synonymy: Urolophus aurantiacus: Chen & Chung, 1971: 28; Chen & Joung, 1993: 86, pl. 12 (fig. 8); Shao *et al.*, 2008: 237; Shen & Wu, 2011: 100, fig. *Urogymnus auranticus*: Qiu, 1994: 134.

Taiwan voucher material: (40 spec.) ASIZP 61007 (5 spec.), 23 Oct 2000; ASIZP 057913, female 186 mm TL, Da-xi, 17 Sep 1990; ASIZP 60945 (6 spec.), 250–319 mm TL, 23 Mar 2001; ASIZP 60465, female 254 mm TL, 16 Nov 1996; ASIZP 0061200 (8 spec.), 23 Oct 2000; NMMB-P 6191, Da-xi, 8 Mar 2003; NMMB-P 7106, Dong-gang, 26 Dec 2003; NMMB-P 7472, Da-xi, 16 Apr 2004; CAS 235427, adult male 286 mm TL, CSIRO H 6293-24, female 295 mm TL, CSIRO H 6293-25, embryo 91 mm TL, Da-xi, 22 May 2005; UF 159700, female 247 mm TL, Da-xi, 26 May 2005; NMMB-P 15469, Da-xi, 23 Oct 2011; NMMB-P 15775, 6 Sep 2010; CSIRO H 7395-25, female 315 mm TL, CSIRO H 7395-26, female 280 mm TL, CSIRO H 7395-27, female 313 mm TL, CSIRO H 7395-28, female 299 mm TL, CSIRO H 7395-29, female 329 mm TL, CSIRO H 7395-30, female 335 mm TL, Da-xi, 14 Mar 2012; CSIRO H 7396-06, juvenile male 184 mm TL, CSIRO H 7396-07, female 123 mm TL, Nan-fang-ao, 14 Mar 2012; AMNH 258305 (tissue accession GN9961), adult male 257 mm TL, CSIRO H 7394-21 (tissue accession GN9960), adult male 230 mm TL, Da-xi, 13 Mar 2012.

Remarks: Common bycatch of trawl fisheries in Taiwanese waters. DNA barcoding has revealed differences in Taiwanese and Japanese specimens (R. Ward, unpubl. data), but examination of specimens from both locations failed to find any major morphologically or meristic differences; Japanese specimens appear to be more reddish brown in colour than Taiwanese specimens, but this needs to be investigated further to determine if this is a consistent difference between the two populations.

Conservation status: Near Threatened.

Family Dasyatidae Jordan, 1888

Stingarees / 土魷科

Genus *Dasyatis* Rafinesque, 1810a

Fintail Stingrays / 土魷屬

Dasyatis Rafinesque, 1810a: 16. Type species: *Dasyatis ujo* Rafinesque, 1810a, by monotypy, a junior synonym of *D. pastinaca* (Linnaeus, 1758).

Dasyatis cf. akajei

Red Stingray / 赤土魷

Trygon akajei Müller & Henle, 1841: 165, pl. 54 (left figure). Lectotype: RMNH 4255a, female 146 mm DW, southwest coast of Japan; lectotype designation by Boeseman (1947).

Local synonymy: Dasyatis akajei: Jordan & Evermann, 1902: 318, fig. 2; Jordan & Richardson, 1909: 165, fig. 2; Fowler, 1941: 428; Chen, 1948: 2; Chen & Chung, 1971: 39, fig. 24; Chen & Yu, 1986: 160; Yang, 1981: 7, fig. 6;

Nishida & Nakaya, 1990: 333; Chen & Joung, 1993: 86, pl. 12 (fig. 7); Shao *et al.*, 1993: 120; Shao *et al.*, 2008: 237; Chen *et al.*, 2010: 2, fig. A; Shen & Wu, 2011: 101, fig. ?*Dasyatis navarrae*: Fowler, 1941: 424; Chen & Chung, 1971: 40; Chen & Yu, 1986: 160; Nishida & Nakaya, 1990: 338; Chen & Joung, 1993: 85, pl. 12 (fig. 6); Shen & Wu, 2011: 101, fig.

Taiwan voucher material: (12 spec.) AMNH 258173 (tissue accession GN9934), juvenile male 257 mm DW, CSIRO H 7394-01 (tissue accession GN9936), female 251 mm DW, CSIRO H 7394-02 (tissue accession GN9937), juvenile male 225 mm DW, CSIRO H 7394-03 (tissue accession GN9938), juvenile male 173 mm DW, MNHN 2013-0452 (tissue accession GN9933), adult male 416 mm DW, CAS 236050, juvenile male 275 mm DW, Da-xi, 13 Mar 2012; NMMB-P HO-276, adult male 350 mm DW, Dong-gang, 21 Mar 2012; CSIRO H 7398-01, juvenile male 265 mm DW, CSIRO H 7398-02, juvenile male 220 mm DW, MNHN 2013-0453, 215 mm DW, Dong-gang, 18 Mar 2012; CSIRO H 7401-01 (tail only), CSIRO H 7401-02 (tail only), Dong-gang, 19 Mar 2012.

Remarks: Illustration in Chen & Chung (1971) based on THUP 00837 (note: same registration number as *D. akajei* specimen); specimen whereabouts not known. Commonly landed as a bycatch species in demersal fisheries in Taiwanese waters. Drawing in Chen & Chung (1971) very closely resembles the *D. kuhlii* illustration (fig. 23), but the description does not. The conspecificity of Taiwanese and Japanese forms is questionable and is presently being evaluated for some of the present authors.

Conservation status: Near Threatened.

?*Dasyatis microphthalmus* Chen, 1948

Smalleye Stingray / 小眼土魷

Dasyatis microphthalmus Chen, 1948:8, fig. 6. Holotype: lost (see Manjaji, 2004 and Ho & Shao, 2011). Type locality: Keelung fish market.

Local synonymy: *Dasyatis microphthalmus*: Chen, 1948: 8, fig. 6; Chen & Joung, 1993: 82; Manjaji-Matsumoto & Last, 2006: 295. *Himantura microphthalma*: Compagno & Roberts, 1982: 323. *Himantura microphthalmus*: Ho & Shao, 2011: 20.

Remarks: Manjaji-Matsumoto & Last (2006) confirmed the holotype of this species as being lost and considering no specimens of this species have been examined, considered *D. microphthalmus* as *nomen dubium*, but possibly conspecific with *D. acutirostra* Nishida & Nakaya, 1988.

Conservation status: Not Evaluated.

Dasyatis ushieii (Jordan & Hubbs, 1925)

Cow Stingray / 尤氏土魷

Dasybatis ushieii Jordan & Hubbs, 1925: 114. Holotype: FMNH 59380, male 367 mm DW, Mikawa Bay, Aichi Prefecture, Japan.

Local synonymy: *Dasyatis ushieii*: Teng, 1962: 232, fig. 63; Chen & Chung, 1971: 36; Chen & Yu, 1986: 159. *Dasyatic ushieii*: Shao *et al.*, 1993: 120.

Taiwan voucher material: UF 148933 (tail only), adolescent female, Da-xi, 24 May 2005.

Remarks: Only occasionally observed in fish markets in Taiwan.

Conservation status: Data Deficient.

***Dasyatis zugei* (Müller & Henle, 1841)**

Sharpnose Stingray / 尖嘴土魷

Trygon zugei Müller & Henle, 1841: 165, pl. 54 (right figure). Lectotype: MNHN 1987-0152, male 137 mm DW, Macao, China; lectotype designation by Nishida & Nakaya (1988).

Local synonymy: *Dasyatis cheni*: Teng, 1962: 237, fig. 65; Chen & Yu, 1986: 160. *Dasyatis zugei*: Chen, 1948: 2, 7, fig. 5; Chen & Chung, 1971: 35, fig. 22; Chen & Yu, 1986: 159; Chen & Joung, 1993: 83, pl. 12 (fig. 1); Chen *et al.*, 2010: 4, figs B, C; Ho & Shao, 2011: 20; Shen & Wu, 2011: 102, fig. *Dasyatic zuguei*: Shao *et al.*, 1993: 120.

Taiwan voucher material: (10 spec.) CSIRO H 7394-04 (tissue accession GN9941), adult male 236 mm DW, CSIRO H 7394-05 (tissue accession GN9942), adult male 222 mm DW, MNHN 2013-0454 (tissue accession GN9939), female 279 mm DW, MNHN 2013-0455 (tissue accession GN9940), adult male 259 mm DW, Da-xi, 13 Mar 2012; CSIRO H 7395-07 (tissue accession GN9995), 167 mm DW, Da-xi, 14 Mar 2012; AMNH 258174 (tissue accession GN10079), juvenile male 181 mm DW, MNHN 2013-0456 (tissue accession GN10078), adult male 252 mm DW, Da-xi, 15 Mar 2012; NMMB-P HO-309, HO-310, HO-311, Wu-chi, Taichong, 10 Apr 2012.

Remarks: Drawing in Chen & Chung (1971) based on THUP 00837 (note: same registration number as *D. akajei* specimen). Commonly landed as a bycatch species of bottom trawl fisheries in Taiwanese waters. *Dasyatis cheni* Teng, 1962, described from a specimen collected from Keelung, is a junior synonym of this species.

Conservation status: Near Threatened.

Genus *Himantura* Müller & Henle, 1837

Whiprays / 窄尾魷屬

Himantura Müller & Henle, 1837b: 400. Type species: *Raja sephen uarnak* Forsskål, 1775, by subsequent designation.

***Himantura gerrardi* (Gray, 1851)**

Whitespotted Whipray / 齊氏窄尾魷

Trygon gerrardi Gray, 1851: 116. Syntypes (2 stuffed spec.): BMNH 1843.5.19.1, 148 mm DW, BMNH 1846.11.18.49, 218 mm DW, Indian Ocean near India.

Local synonymy: *Dasyatis gerrardi*: Chen & Chung, 1971: 32, fig. 21; Chen & Yu, 1986: 159; Chen & Joung, 1993: 84, pl. 12 (fig. 3). *Dasyatic gerrardi*: Shao *et al.*, 1993: 120. *Himantura gerrardi*: Chen, 2004: 25; Weigmann, 2011: 265. *Himantura gerardi*: Shen & Wu, 2011: 102, fig.

Taiwan voucher material: (5 spec.) FRIP 03562; NMMB-P HO-45 (tissue accession GN9932), juvenile male 336 mm DW, Da-xi, 13 Mar 2012; CSIRO H 7395-08, juvenile male 373 mm DW, MNHN 2013-0457 (tissue accession GN10036), juvenile male 343 mm DW, Da-xi, 14 Mar 2012; AMNH 258175 (tissue accession GN10064), female 295 mm DW, Nan-fang-ao, 14 Mar 2012.

Remarks: Drawing in Chen & Chung (1971) based on THUP 01254 (as *Dasyatis gerrardi*). Probably a species complex and requiring a detailed taxonomic revision.

Conservation status: Vulnerable.

***Himantura leoparda* Manjaji-Matsumoto & Last, 2008**

Leopard Whipray / 豹紋窄尾魷

Himantura leoparda Manjaji-Matsumoto & Last, 2008: 294, figs 1–4, 5a. Holotype: CSIRO H 2903-01, female 1105 mm DW, north-west of Weipa, Gulf of Carpentaria, Queensland, 12°08' S, 139°58' E, 21 Nov 1991.

Local synonymy: *Himantura undulata*: Chen, 2004: 25. Also confused with *Himantura uarnak* in literature from the western North Pacific.

Taiwan voucher material: (1 specimen) CAS 235430, juvenile male 356 mm DW, Da-xi, 24 May 2005.

Remarks: Recently described by Manjaji-Matsumoto & Last (2008) as part of the ‘*uarnak*’ species complex; previously confused with *H. uarnak* and *H. undulata*. Further taxonomic investigation of this complex is required. Two of us (PL, WW) positively identified this species from images of two adult specimens caught off the Penghu Islands in April 2006.

Conservation status: Vulnerable.

***Himantura uarnak* (Gmelin, 1789)**

Reticulate Whipray / 花點窄尾魷

Raja uarnak Gmelin, 1789: 1509. No types known. Type locality: Red Sea.

Local synonymy: *Dasyatis uarnak*: Chen & Chung, 1971: 32; Chen & Yu, 1986: 159; Chen & Joung, 1993: 84, pl. 12 (fig. 4). *Himantura uarnak*: Manjaji, 2004: 5-90; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 102, fig.

Taiwan voucher material: (2 spec.) NMMB-P 15735; NMMB-P 15784.

Remarks: A species complex also involving *H. leoparda*. These species are frequently misidentified as there are few reliable field characters to distinguish them.

Conservation status: Vulnerable.

Genus *Neotrygon* Castelnau, 1873

Maskrays / 新魷屬

Neotrygon Castelnau, 1873: 122. Type species: *Raja trigonoides* Castelnau, 1873, by monotypy.

***Neotrygon kuhlii* (Müller & Henle, 1841)**

Bluespotted Maskray / 古氏新魷

Trygon kuhlii Müller & Henle, 1841: 164, pl. 51 (right). Syntypes: MNHN 0000-2440 (2 spec.), Vanikoro, Solomon Islands, MNHN A7931, New Guinea, RMNH (dry), India?.

Local synonymy: *Dasyatis kuhlii*: Chen, 1948: 1; Chen & Chung, 1971: 37, fig. 23; Liu *et al.*, 1985: 161, fig.; Chen & Yu, 1986: 160; Chen & Joung, 1993: 83, pl. 12 (fig. 2); ; Shao *et al.*, 2008: 237; Chen, 2004: 25; Chen *et al.*, 2010: 3, figs B–D; Shen & Wu, 2011: 101

Taiwan voucher material: (14 spec.) FRIP 00341; FRIP 02053; NMMB-P 15774, 30 Aug 2010; CAS 235429, adolescent male 294 mm DW, UF 159201, adolescent male 257 mm DW, Da-xi, 24 May 2005; CSIRO H 6296-02, adult male 282 mm DW, CSIRO H 6292-03, adult male 280 mm DW, Da-xi, 25 May 2005; AMS I. 43793-001, 23°34' N, 119°34' E, Ma-gong, Penghu Islands, 25 May 2005; CSIRO H 7394-06 (tissue accession GN9948), adult male 288 mm DW, HUMZ 213854 (tissue accession GN9947), adult male 278 mm DW, MNHN 2013-0458 (tissue accession GN9945), female 284 mm DW, NMMB-P HO-59 (tissue accession GN9946), adult male 327 mm DW, NMMB-P HO-56 (tissue accession GN9943), adult male 284 mm DW, CAS 236070 (tissue accession GN9944), adult male 280 mm DW, Da-xi, 13 Mar 2012.

Remarks: Drawing in Chen & Chung (1971) based on THUP 01258 (as *Dasyatis kuhlii*); specimen whereabouts not known. Possibly a species complex. A phylogeographic study by Puckridge *et al.* (2013) provided further insight into the taxonomic complexity of this species complex. Populations of *N. kuhlii* from the Gulf of Thailand through to Taiwan are likely to be distinct species and are currently under revision by one of us (PRL).

Conservation status: Data Deficient.

Genus *Taeniura* Müller & Henle, 1837a

Bluespotted Fantail Ray / 條尾魷屬

Taeniura Müller & Henle, 1837a: 117. Type species: *Trygon ornatus* Gray, 1830, by monotypy, synonym of *T. lymma*.

***Taeniura lymma* (Forsskål, 1775)**

Bluespotted Fantail Ray / 藍斑條尾魷

Raja lymma Forsskål, 1775: 17. No types known. Type locality: Al-Luhayya, Yemen, Red Sea.

Local synonymy: none.

Taiwan voucher material: No specimens examined.

Remarks: Images of two Taiwanese specimens supplied by Dr. K.T. Shao (ASIZP) are verified as this species. Possibly known only from extralimital records.

Conservation status: Near Threatened.

Genus *Taeniurops* Garman, 1913

Fantail Rays / 擬條尾魷屬

Taeniurops Garman, 1913: 399. Type species: *Taeniura meyeri* Müller & Henle, 1841, by subsequent designation.

***Taeniurops meyeri* (Müller & Henle, 1841)**

Blotched Fantail Ray / 麥氏擬條尾魷

Taeniura meyeri Müller & Henle, 1841: 172, pl. 55. Syntypes: MNHN 0000-2428, ZMB 4660, Mauritius, Mascarenes, southwestern Indian Ocean.

Local synonymy: *Taeniura melanospila*: Teng, 1962: 219, fig. 59; Chen & Chung, 1971: 30. *Taeniura melanospilos*: Chen & Yu, 1986: 159. *Taeniura meyeri*: Chen, 2004: 25. *Taeniura meyeri*: Teng, 1962: 218; Chen & Chung, 1971: 31; Chen & Yu, 1986: 159; Shao *et al.*, 2008: 237; Chen *et al.*, 2010: 5, fig. A.

Taiwan voucher material: NMMB-P HO-80, tissue collected only, Da-xi, 14 Mar 2012.

Remarks: Not commonly landed. Generic placement still under debate; previously considered to belong in *Taeniura*, but placed in *Taeniurops* by Last & Stevens (2009), and evidence suggests it may belong in *Dasyatis*.

Conservation status: Vulnerable.

Genus *Urogymnus* Müller & Henle, 1837

Porcupine Rays / 糙粒魷屬

Urogymnus Müller & Henle, 1837b: 434. Type species: *Raja asperrima* Bloch & Schneider, 1801, by being a replacement name.

***Urogymnus asperrimus* (Bloch & Schneider, 1801)**

Porcupine Ray / 棘糙粒魷

Raja asperrima Bloch & Schneider, 1801: 367. Holotype: ZMB 7836 (dry skin, partial specimen), Mumbai, India.

Local synonymy: *Urogymnus africanus*: Teng, 1962, 215, fig. 58; Chen & Chung, 1971: 40; Chen & Yu, 1986: 159. *Urogymnus asperrimus*: Chen *et al.*, 2010: 5, fig. D, E.

Taiwan voucher material: No specimens examined.

Remarks: Probably not common.

Conservation status: Vulnerable.

Family Gymnuridae Fowler, 1934

Butterfly Rays / 鳶魷科

Genus *Gymnura* van Hasselt, 1823

Butterfly Rays / 鳶魷屬

Gymnura van Hasselt, 1823: 316. Type species: *Raja micrura* Bloch & Schneider, 1801, by monotypy.

Gymnura japonica (Temminck & Schlegel, 1850)

Japanese Butterfly Ray / 日本鳶魷

Pteroplatea japonica Temminck & Schlegel, 1850: 309, pl. 141. Lectotype: RMNH D2479 (stuffed); Paralectotypes: RMNH D2478, D2480–2481, D2484, 4252a–c, ZMB 4650, Nagasaki Bay, Japan.

Local synonymy: Gymnura japonica: Chen & Chung, 1971: 42, fig. 26; Chen & Yu, 1986: 161; Shen, 1988: Chen & Joung, 1993: 87, fig. 2; Chen, 2004: 25; Shen & Wu, 2011: 103, fig.

Taiwan voucher material: THUP 01251, 293.5 mm DW from Keelung (in Chen & Chung, 1971); NTUM 00035, (4 spec.) Ma-gong; NTUM 00052, Ma-gong; NTUM 01702, Da-xi (in Shen, 1988). No additional specimens were observed during the 2012 survey.

Remarks: *Gymnura bimaculata* is frequently seen in the Taiwanese literature, but Ishihara *et al.* (2009) and Shen *et al.* (2012) examined the issue and concluded that *G. bimaculata* is a junior synonym of *G. japonica*.

Conservation status: Data Deficient.

Gymnura zonura (Bleeker, 1852)

Zonetail Butterfly Ray / 菱鳶魷

Aetoplatea zonurus Bleeker, 1852: 79. Holotype: BMNH 1867.11.28.163, Jakarta, Java, Indonesia.

Local synonymy: Aetoplatea zonura: Chen & Chung, 1971: 41, fig. 25 (NTUM 858, 346 mm DW, Kaohsiung); Chen & Yu, 1986: 161; Shen, 1988: 6 (NTUM 6676, Hsin-Da Port; Chen & Joung, 1993: 87, fig. 10; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 103, fig.

Taiwan voucher material: (5 spec.) CAS 235432, juvenile male 462 mm DW, Da-xi, 24 May 2005; UF 159292, male 657 mm DW, Da-xi, 25 May 2005; NMMB-P HO-065 (tissue accession GN9952), adult male 724 mm DW; AMNH 258301 (tissue accession GN9953), adult male 546 mm DW, MNHN 2013-0461 (tissue accession GN9954), adult male, 555 mm DW, Da-xi, 13 Mar 2012.

Remarks: Commonly landed in fish markets. DAE and WTW observed this species during previous surveys in 1988 and 2005.

Conservation status: Vulnerable.

Family Myliobatidae Bonaparte, 1838

Eagle Rays / 鱈科

Genus *Aetobatus* Blainville, 1816

Bonnetrays / 鰩屬

Aetobatus Blainville, 1816: 112 [=120]. Type species: *Raja aquila* Linnaeus, 1758, by subsequent designation; type often given as *narinari* since *aquila* is now placed in *Myliobatis*; more research is required.

***Aetobatus ocellatus* (Kuhl in van Hasselt, 1823)**

Whitespotted Eagle Ray / 眼斑鰩鱈

Myliobatus ocellatus Kuhl in van Hasselt, 1823: 316. No original types designated; Java, Indonesia. Neotype: MZB 18225, juvenile male 477 mm DW (1422 mm TL), Muara Angke fish market, Jakarta, Java, Indonesia; neotype designation by White *et al.* (2010).

Local synonymy: Aetobatus narinari: Chen & Chung, 1971: 47, fig. 29; Liu *et al.*, 1985: 89 (not fig.); Chen & Yu, 1986: 163; Chen & Joung, 1993: 88, pl. 13 (fig. 3); Shao *et al.*, 1993: 126; Chen *et al.*, 1995: 25; Chen, 2004: 25; Shao *et al.*, 2008: 237; Schluessel *et al.*, 2010a: 1278; Schluessel *et al.*, 2010b: 46; Shen & Wu, 2011: 104, fig. *Aetobatus ocellatus: White et al.* (2010): 141.

Taiwan voucher material: (7 spec.) NMMB-P 15728; NMMB-P 15733; NMMB-P 15734; NMMB-P 15741; NMMB-P 15744; NMMB-P 15749; NMMB-P 15753.

Remarks: Relatively common in landings from coastal fisheries in Taiwanese waters, particularly off Penghu Islands. Previously considered to be conspecific with A. narinari (Euphrasen, 1790), which was considered to have a circumglobal distribution, but recently this was recognised as a species complex and A. ocellatus was clarified as the Indo-West Pacific species; Aetobatus narinari is probably only found in the Western Atlantic.

Conservation status: Not Evaluated.

Genus *Aetomylaeus* Garman, 1908

Smoothtail Eagle Rays / 無刺鰩鱈屬

Aetomylaeus Garman, 1908: 252. Type species: *Myliobatis maculatus* Gray, 1834, by original designation; misspelled *Aetomyleus* in Zoological Record for 1908.

***Aetomylaeus maculatus* (Gray, 1834)**

Mottled Eagle Ray / 花點圓吻燕魷

Myliobatus maculatus Gray, 1834: no page number, pl. 101. No types known; Penang, Malaysia.

Local synonymy: Aetomylus maculatus: Chen & Chung, 1971: 45. *Aetomylus milvus: Chen & Chung*, 1971: 47. *Aetomylaeus maculatus: Chen & Yu*, 1986: 162. *Aetomylaeus milvus: Chen & Yu*, 1986: 163.

Taiwan voucher material: FRIP 03570.

Remarks: Very few Taiwanese records exist of this species. Taiwan is the northernmost point of its distribution so possibly only extralimital records exist for Taiwan. Previously confused with Aetomylaeus milvus (Müller & Henle, 1841), which is probably confined to the Western Indian Ocean; confusion based on colour pattern with forms with spots only referred to as A. maculatus and those with a slight reticulated pattern referred to as A. milvus, but differences are ontogenetic with smaller specimens having some reticulations as well as spots.

Conservation status: Endangered.

Aetomylaeus nichofii (Bloch & Schneider, 1801)

Banded Eagle Ray / 聶氏圓吻燕魷

Raja nichofii Bloch & Schneider, 1801: 364 (579). No types known; East Indies (Indonesia).

Local synonymy: *Aetomylus nichofii*: Chen & Chung, 1971: 46, fig. 28. *Aetomylaeus nichofii*: Chen & Yu, 1986: 163; Chen & Joung, 1993: 89, pl. 13 (fig. 4); Shen & Wu, 2011: 104, fig.

Taiwan voucher material: (5 spec.) NMMB-P 6290, Kaohsiung, 7 Feb 1966; CAS 235433, adult male 505 mm DW, Da-xi, 25 May 2005; AMNH 258302 (tissue accession GN9925), juvenile male 405 mm DW, CSIRO H 7394-07 (tissue accession GN9924), juvenile male 427 mm DW, CSIRO H 7394-08 (tissue accession GN9926), female 621 mm DW, Da-xi, 13 Mar 2012.

Remarks: Relatively common in the landings of coastal fisheries in Taiwan. Adult males sometimes develop short bony “horns” on anterior of orbits.

Conservation status: Vulnerable.

Aetomylaeus vespertilio (Bleeker, 1852)

Ornate Eagle Ray / 網紋圓吻燕魷

Myliobatis vespertilio Bleeker, 1852: 85. Holotype: RMNH 7460, 560 mm DW, Jakarta, Java, Indonesia.

Local synonymy: *Aetobatus reticulatus*: Teng, 1962: 252, fig. 71; Chen & Chung, 1971: 49; Chen & Joung, 1993: 88; Chen & Yu, 1986: 163. *Aetomylaeus vespertilio*: Ho & Shao, 2011: 21.

Taiwan voucher material: (1 specimen) TFRI 2911 (holotype of *A. reticulatus*), 1052 mm DW, Keelung, Taiwan.

Remarks: Very few Taiwanese records of this species; northernmost point in the distribution of this species and possibly only extralimital records in Taiwanese waters. *Aetobatus reticulatus* Teng, 1962 described from Keelung is a junior synonym of this species.

Conservation status: Endangered.

Genus *Myliobatis* Cuvier, 1816

Eagle Rays / 鳶鱗屬

Myliobatis Cuvier, 1816: 137. Type species: *Raja aquila* Linnaeus, 1758, by subsequent designation.

Myliobatis tobijei Bleeker, 1854

Kite Ray / 鳶鱗

Myliobatis tobijei Bleeker, 1854: 425. Holotype: RMNH 7461 (largest of 2), female, Nagasaki, Japan.

Local synonymy: *Myliobatis tobijei*: Chen, 1948: 11, fig. 9; Chen & Chung, 1971: 44; Chen & Joung, 1993: 90, pl. 13 (fig. 5); Shao *et al.*, 1993: 126; Chen & Yu, 1986: 162; Chen, 2004: 25; Shao *et al.*, 2008: 237; Shen & Wu, 2011: 104, fig.

Taiwan voucher material: NMMB-P 6308, Da-xi, 30 Apr 2002; NMMB-P 15751 ; CSIRO H 6296-06, embryo 192 mm DW, Da-xi, 25 May 2005; AMNH 258303 (tissue accession GN9949), female 395 mm DW, NMMB-P HO-63 (tissue accession GN9950), juvenile male 496 mm DW, Da-xi, 13 Mar 2012.

Remarks: Relatively common in the landings of coastal fisheries in Taiwan.

Conservation status: Data Deficient.

Family Rhinopteridae Jordan & Evermann, 1896

Cownose Rays / 牛鼻鱸科

Genus *Rhinoptera* Cuvier, 1829

Cownose Rays / 牛鼻鱸屬

Rhinoptera Cuvier, 1829:401. Type by subsequent designation. Type designated by Bonaparte, 1828: 6 (of separate), also by Hay, 1902: 321. Appeared first as *Rhenoptera* van Hasselt, 1823: 318 and *Rhinoptera* van Hasselt, 1824: 90, regarded as *nomina nuda*. Cuvier's "Les Rhinoptera Kuhl" evidently sufficient to Latinise; two included species.

***Rhinoptera javanica* Müller & Henle, 1841**

Javanese Cownose Ray / 爪哇牛鼻鱸

Rhinoptera javanica Müller & Henle, 1841: 182, pl. 58. Syntypes (4): MNHN 0000-2450 (1); MNHN 0000-3478 (1, dry) from Malabar, India; RMNH (3, dry), Java, Indonesia.

Local synonymy: *Rhinoptera javanica*: Chen & Chung, 1971: 49, fig. 30; Shen, 1984a: 81, fig.; Chen & Yu, 1986: 164; Chen & Joung, 1993: 90, pl. 13.6; Shen & Wu, 2011: 104, fig.

Taiwan voucher material: (2 spec.) THUP01010, 1 specimen 694 mm DW, from Penghu (in Chen & Chung, 1971); TFRIPB8312311, 1 specimen 915 mm (in Chen, 2004).

Remarks: This species appears to be rather uncommon in fish markets.

Conservation status: Vulnerable.

Family Mobulidae Gill, 1893

Devil Rays / 蝠鱮科

Genus *Manta* Bancroft, 1829

Mantas / 前口蝠鱮屬

Manta Bancroft, 1829: 454. Type species: *Cephalopterus manta* Bancroft 1829 by monotypy (and tautonomy).

***Manta alfredi* (Krefft, 1868)**

Reef Manta / 阿氏前口蝠鱮

Deratoptera alfredi Krefft, 1868: 3–9, fig. Holotype: AMS I.1731 (stuffed), Watson Bay, Sydney, NSW, Australia.

Local synonymy: None, but refer to synonymy of *M. birostris* as previously published records may have referred to either species.

Taiwan voucher material: None.

Remarks: Even though not yet confirmed from Taiwanese waters, this species is likely to occur there and could have been confused with *M. birostris* in past records.. Resurrected as a valid species and redescribed by Marshall *et al.* (2009).

Conservation status: Vulnerable. This species has been proposed for listing under CITES Appendix II (CITES, 2013).

Manta birostris (Walbaum, 1792)

Giant Oceanic Manta / 短吻前口蝠鱚

Raja birostris Walbaum, 1792: 535. No types known. No locality stated in description.

Local synonymy: *Manta birostris*: Chen & Chung, 1971: 205, fig. 190; Chen & Yu, 1986: 165; Chen & Joung, 1993: 91, fig. 8; Shen & Wu, 2011: 105, fig.

Taiwan voucher material: (1 specimen) TFRI 103640, 467 mm DW, Keelung (in Chen & Chung, 1971).

Remarks: DAE observed several large mantas that were landed in Keelung during a survey in April-May 1988; at the time of these observations (1988) only one species of *Manta* was recognised so confirmation of the species is not possible.

Conservation status: Vulnerable. This species has been proposed for listing under CITES Appendix II (CITES, 2013).

Mobula japonica (Müller & Henle, 1841)

Spinetail Devilray / 日本蝠鱚

Cephaloptera japonica Müller & Henle, 1841: 185. Lectotype: RMNH D2440 (dry, young); Paralectotype (1, lost), Nagasaki, Japan.

Local synonymy: *Mobula japonica*: Chen, 1948: 31 & 50; Chen & Joung, 1993: 91, pl. 14.1 (NTUM 83, 545 mm DW, Keelung); Chen, 2004: 26 (TFRI PB 8112143, 717 mm DW). *Mobula japonica*: Chen & Chung, 1971: 50; Shen & Wu, 2011: 106, fig.

Taiwan voucher material: Not examined in this study, but referred to in previous publications (see synonymy above).

Remarks: None.

Conservation status: Near Threatened.

Mobula tarapacana (Philippi, 1892)

Sicklefin Devilray / 褐背蝠鱝

Cephaloptera tarapacana Philippi, 1892: 8, pl. 3(fig.2). Types unknown.

Local synonymy: *Mobula formosana* Teng, 1962: 259, fig. 74 (TFRI 2911, holotype, 1052 mm DW, lost); Chen & Chung, 1971: 51; Shen, 1984a: 82, fig.; Chen & Yu, 1986: 165; Chen & Joung, 1993: 91, pl. 14.1. *Mobula tarapacana*: Shen & Wu, 2011: 105, fig. *Mobula diabolus*: Chen & Yu, 1986: 156.

Taiwan voucher material: Based on holotype of *Mobula formosana*, not examined for this study.

Remarks: None.

Conservation status: Data Deficient.

Mobula thurstoni (Lloyd, 1908)

Bentfin Devilray / 印度蝠鱝

Dicerobatis thurstoni Lloyd, 1908: 179, Fig. 3, Pl. 4 (Fig. 2). Syntypes: Madras Museum, but whereabouts unknown.

Local synonymy: Compagno & Last, 1999: 1529, fig.

Taiwan voucher material: None.

Remarks: The species was mentioned in Compagno & Last (1999) as occurring in Taiwanese waters, but we could find no records of it during the present survey to confirm its occurrence.

Conservation status: Near Threatened.

Order Chimaeriformes

Family Chimaeridae Rafinesque, 1815

Shortnose Chimaeras / 銀鮫科

Genus *Chimaera* Linnaeus, 1758

Rabbitfishes / 銀鮫屬

Chimaera Linnaeus, 1758: 236. Type by Linnaean tautonymy.

Chimaera phantasma Jordan & Snyder, 1900

Silver Chimaera / 黑線銀鮫

Chimaera phantasma Jordan & Snyder, 1900: 338. Holotype: USNM 49398. Type locality: Tokyo Bay, Japan.

Local synonymy: *Chimaera phantasma*: Shen, 1984a: 83, fig.; Chen & Joung, 1993: 31, pl. 1.1; Shao *et al.*, 2008: 236; Shen & Wu, 2011: 51, fig.

Taiwan voucher material: (29 spec.) CAS 235434, female 590 mm TL, CAS 235435, female 385 mm TL, CSIRO H 6292-05, male 500 mm TL, CSIRO H 6292-06, male 493 mm TL, Da-xi, 21 May, 2005; CAS 235436, juvenile male 210 mm TL, CAS 235437, female 220 mm TL, CSIRO H 6294-16, juvenile male 200 mm TL, UF 159285, juvenile male 235 mm TL, Da-xi, 23 May, 2005; CAS 235438, female 663 mm TL, CSIRO H 6295-23, female 556 mm TL, UF 159478 (5 spec.), female 662 mm TL, female 533 mm TL, female 431 mm TL, juvenile male 437 mm TL, juvenile female 455 mm TL, Da-xi, 24 May 2005; AMNH 258153 (tissue accession GN9968), female 248 mm PCL, CSIRO H 7395-06 (tissue accession GN9970), female 160 mm PCL, CSIRO H 7395-03 (tissue accession GN9971), female 154 mm PCL, CSIRO H 7395-04 (tissue accession GN9977), female 143 mm PCL, CSIRO H 7395-31 (tissue accession GN9980), juvenile male 147 mm PCL, CSIRO H 7395-32 (tissue accession GN9981), female 148 mm PCL, CSIRO H 7395-33 (tissue accession GN9982), female 148 mm PCL, CSIRO H 7395-34, female 130 mm PCL, CSIRO H 7395-35 (tissue accession GN9984), juvenile male 135 mm PCL, MNHN 2013-0396 (tissue accession GN9978), female 166 mm PCL, MNHN 2013-0397 (tissue accession GN9979), juvenile male 152 mm PCL, Da-xi, 15 Mar 2012; AMNH 258154, female 159 mm PCL, MNHN 2013-0398, juvenile male 127 mm PCL, MNHN 2013-0399, female 139 mm PCL, Dong-gang, 20 Mar 2012.

Remarks: The most common chimaerid species observed at fish markets in Taiwan. It is usually a retained component of bycatch and is marketed for human consumption.

Conservation status: Data Deficient.

Genus *Hydrolagus* Gill, 1862

Ratfishes / 兔銀鮫屬

Hydrolagus Gill, 1862: 331. Type by monotypy.

***Hydrolagus mitsukurii* (Dean, 1904)**

Mitsukuri's Chimaera / 箕作氏兔銀鮫

Chimaera mitsukurii Dean, 1904: 6, figs. 1–2, Pl. 1. Holotype: ZUMT 1457. Type locality: Misaki, Sagami Sea, Japan.

Local synonymy: *Hydrolagus mitsukurii*: Shao et al., 2008: 236; Shen & Wu, 2011: 51, fig.

Taiwan voucher material: (15 spec.) CAS 235446, female 451 mm TL, CAS 235445, female 211 mm TL, CSIRO H 6292-01, female 487 mm TL, Da-xi, 21 May 2005; CAS 235443, female, 211 mm TL, CAS 235444, female 211 mm TL, Da-xi, 25 May 2005; CSIRO H 7395-05 (tissue accession GN9969), female 250 mm PCL, HUMZ 213794 (tissue accession GN9975), juvenile male 128 mm PCL, HUMZ 213794, female, 137 mm PCL, CAS 236065 (tissue accession GN9972), female 191 mm PCL, CAS 236065 (tissue accession GN9973), female 184 mm PCL, MNHN 2013-0404, juvenile male 130 mm PCL, Da-xi, 15 Mar 2012; CAS 236066, adult male 451 mm PCL, CAS 236066, female 222 mm PCL, Da-xi, 16 Mar 2012; CAS 236067, female 116 mm PCL, Dong-gang, 20 March 2012; CAS 236067, female 90 mm PCL, Dong-gang, 20 Mar 2012.

Remarks: This species is not nearly as common as *C. phantasma*, but as fisheries have moved into deeper water this appears to be more commonly observed at fish markets now than was apparent 20 years ago.

Conservation status: Data Deficient.

Family Rhinochimaeridae Garman, 1901

Longnose Chimaeras / 長吻銀鮫科

Genus *Rhinochimaera* Garman, 1901

Knifetooth Chimaeras / 長吻銀鮫屬

Rhinochimaera Garman, 1901: 75. Type by original designation (also monotypic).

Rhinochimaera africana Compagno, Stehmann & Ebert, 1990

Paddlenose Chimaera / 非洲長吻銀鮫

Rhinochimaera africana Compagno, Stehmann, & Ebert, 1990: 206, figs. 2–5. Holotype: SAIAB [formerly RUSI] 27744. West of Doring Bay, Western Cape, South Africa, 31°59.8' S, 15°56.2' E, 850 m depth.

Local synonymy: Rhinochimaera pacifica: Shao & Hwang, 1997: 97, fig. 1. *Rhinochimaera africana: Didier & Nakaya*, 1999: 147; *Shen & Wu*, 2011: 51, fig.

Taiwan voucher material: ASIZP 57500, female 1165 mm TL, Da-xi, 20 Jan 1995; *CAS 235447* juvenile male 1064 mm TL, Da-xi, 26 May 2005.

Remarks: Shao & Hwang (1997) reported on the first record of a rhinochimaerid from Taiwan, *R. pacifica*, but Shao (pers. comm.) in *Didier & Nakaya* (1999) re-identified his specimen as *R. africana* making it the first confirmed record of that species from Taiwan waters. No additional material was collected during this survey, but two of us (DAE, WTW) collected a specimen and examined several more during a survey in 2005.

Conservation status: Data Deficient.

Rhinochimaera pacifica (Mitsukuri, 1895)

Broadnose Chimaera / 太平洋長吻銀鮫

Harriotta pacifica Mitsukuri, 1895: 97, Pl. 16. Holotype: ZUMT ?1453 (lost). Type locality: Tokyo fish market, originally from Kurihama, near Misaki, Sagami Sea, Japan.

Local synonymy: Rhinochimaera pacifica: Shen & Wu, 2011: 51, fig.

Taiwan voucher material: CAS 235448, juvenile male, Da-xi, 26 May 2005.

Remarks: The specimen cited by Shao & Hwang (1997) as the first record of *R. pacifica* is in fact *R. africana*. Several specimens confirmed as *R. pacifica* were examined by DAE and WTW, and one specimen (CAS 235448) was saved during a survey in May 2005, but no additional material was collected during the present survey.

Conservation status: Least Concern.

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