

**CSIRO MARINE LABORATORIES**  
**Report 243**

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# **CHECKLIST OF PHILIPPINE CHONDRICHTHYES**

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and Alava, M.N.R.**



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Checklist of Philippine chondrichthyes.

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ISBN 1 876996 95 1.

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2. Sharks - Philippines.
3. Stingrays - Philippines.
  - I. Compagno, Leonard Joseph Victor.
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(Series : Report (CSIRO. Marine Laboratories) ; 243).

597.309599

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## CHECKLIST OF PHILIPPINE CHONDRICHTHYES

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### ABSTRACT

Since the first publication on Philippines fishes in 1706, naturalists and ichthyologists have attempted to define and describe the diversity of this rich and biogeographically important fauna. The emphasis has been on fishes generally but these studies have also contributed greatly to our knowledge of chondrichthyans in the region, as well as across the broader Indo–West Pacific. An annotated checklist of cartilaginous fishes of the Philippines is compiled based on historical information and new data. A Taiwanese deepwater trawl survey off Luzon in 1995 produced specimens of 15 species including 12 new records for the Philippines and a few species new to science. Soon after, a major survey of fish markets in the southern Philippines, funded by the World Wildlife Fund, resulted in the collection and storage of specimens of 54 species, of which 41 were new records for the Philippines. Approximately 164 species representing 44 families and 83 genera of cartilaginous fishes have been recorded from Philippine seas from all available sources. The checklist includes 129 valid species records that are based on specimens and unambiguous literature accounts, and 35 additional doubtful records that are mostly based on literature. Of the valid species, about 111 were wholly or partly based on literature records; 109 species wholly or partly on specimens from all sources including museum collections. At least 24 species, mostly collected during the recent surveys, are new to science. An historical overview of research on Philippine cartilaginous fishes is provided, along with sections on the classification, habitat and distribution of the fauna, and a listing of species of conservation concern.

### INTRODUCTION

The Indo–West Pacific has the richest diversity of marine species in the world (Carpenter & Paxton, 1999) and possibly the most diverse chondrichthyan fauna. It also has some of the most heavily exploited sharks and rays and amongst the least well known species in terms of their resource size and biology. Much of the region, particularly the deepwater continental slopes and basins, have never been explored. Hence, the taxonomic knowledge of the region's fishes needs improving to provide an adequate baseline for data acquisition and resource management. Probably, no where more than in the Philippines is this data more urgently needed. Inshore fish stocks are very heavily fished and potentially vulnerable species, such as whale sharks and mantas, are being harvested without being adequately managed.

Knowledge of the Philippine chondrichthyans is based largely on literature records compiled from studies of the broader fish fauna. Fishes were collected from the region in the early 19<sup>th</sup>C and sent to European museums to be identified and named. An historical account of this research to the end of the 20<sup>th</sup>C is given below. More recently, this knowledge has been expanded greatly to include new data collected from a deepwater trawl survey off the northeastern Philippines, and a series of targeted surveys of elasmobranchs from southern Philippine fish markets.

The seas of the Indo–West Pacific have been the subject of much interest for their mega-diversity for the past few centuries. In October 1995, a workshop funded by the United Nations Food and Agriculture Organization (FAO) was convened in Manila to prepare and test sections of a six volume, FAO species identification guide for fisheries purposes to the fauna of the Western Central Pacific (Carpenter & Niem, *eds.*, 1998–2001). Prior to the workshop, specimens were collected from fish markets across the Philippines and sent to the ICLARM offices in Quezon City for study. To coincide with and to supply material to the workshop, a Taiwan Fisheries

Research Institute trawler, the RV *Fishery Researcher 1*, conducted a six day offshore benthic and midwater trawl survey along the outer shelf, slope, and rise off the northeastern Philippines with 35 stations between 0 and 4384 m deep in water 40 to 4667 m deep. Chondrichthyes were captured on eight demersal trawl stations in water 40 to 1100 m deep. The historical collections of fishes at the Marine Science Institute (University of Philippines, Manila) and the Philippine National Museum (PNP, Manila) were also examined for additional records. Two of us (L. Compagno and P. Last) prepared sections of the identification guide, including the accounts of the sharks, batoids and chimaeras.

In October 1998, the World Wildlife Fund (WWF, Philippine branch) with support from World Wildlife Fund (USA branch), in collaboration with Silliman University Marine Laboratory (SUML), the States Polytechnic College of Palawan (SPCP) and the Bureau of Fisheries and Aquatic Resources (BFAR), initiated the Elasmobranch Biodiversity and Conservation Project. This project aimed at identifying and recommending needed conservation and management actions to ensure sustainable elasmobranch fisheries in the Sulu Sea area of the Philippines, a region which is extremely rich in these vulnerable, keystone species. It effectively established a data baseline of sharks, rays and chimaeras currently existing in the Sulu Sea and nearby areas, as well as the fish markets where they occur. Specimens were collected and photographed fresh, and a specimen collection established at the SUML in Dumaguete, Negros. This material was used as the basis of two lengthy workshops and taxonomic and biological training sessions. In May 1999, a formal workshop at SUML was held to identify and record these species. In May 2000, WWF conducted special training sessions for project leaders and/or assistant leaders of the National Stock Assessment Program (NSAP) of BFAR. The objective of this meeting was to enhance the knowledge of field personnel in biology and taxonomy, with the endpoint of seeing these skills employed in assessments of the chondrichthyan fisheries of the 14 coastal regions covered by NSAP. While this project obtained some fishery data from site visits, more information is needed to fully characterize the fisheries, identify diversity "hot spots" and understand the particular sectors catching rare or especially vulnerable species. A final specialist workshop was held at SUML in April 2001 to describe new taxa and finalise identifications of these taxa. The bulk of this collection was formally handed to the Philippine National Museum at the conclusion of the workshop.

This document is dedicated to Ms Andy Oliver whose efforts were instrumental in obtaining support through WWF for this important project. The market surveys and the resulting specimen collections have greatly increased our knowledge of cartilaginous fishes of the Philippines. These observations are summarised, along with a review of historical information, in an annotated checklist below. An historical summary of research on Philippine chondrichthyans is also provided, as well as sections on the classification, habitat and distribution patterns of the fauna, and a listing of species of conservation concern. Common names are accessed from a variety of published sources.

## METHODS

The checklist is structured according to the classification of Compagno (2000), and includes synonymies for all Philippine taxa including citations of authors and type designations. Synonymies are not comprehensive but include taxa of relevance to the Philippine chondrichthyan fauna. Each species usually has a **Reference** section listing important bibliographic citations of Philippine distributional records. No attempt was made to provide comprehensive reference lists such as those of Fowler (1941) and Herre (1953), which were mostly of authors reporting non-Philippine species records for cartilaginous fishes. Our treatment of references is similar to that of Roxas & Martin (1937), who primarily reported Philippine references for species. A **Philippine Material** section is included for each species listing specimens used in the checklist, including extensive material collected by recent WWF and FAO projects. A **Remarks** section provides comments on various taxa. Personal observations are referred to as by L. Compagno or P. Last.

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## THE CHONDRICHTHYAN FAUNA

### Research on Philippine cartilaginous fishes

Research on the biodiversity of Philippine sharks has, for the most part, been accomplished as part of exploratory research on the diversity of Philippine fishes, and by naturalists and systematic ichthyologists during the 18<sup>th</sup>, 19<sup>th</sup>, and 20<sup>th</sup> centuries who did not specialize on cartilaginous fishes. Naturalists published as early as 1706 on Philippine marine fishes, but Carolus Linnaeus' publication of his 10th edition of *Systema Naturae* (Linnaeus, 1758) set the stage for ichthyological exploration of the world by European research institutions as a part of the great wave of conquest, colonization, trade, and exploitation in the 18<sup>th</sup> and 19<sup>th</sup> centuries. French expeditions with royal missions to explore the globe and to collect its natural treasures visited the Philippines, collected fishes, and deposited them in the *Museum National d'Histoire Naturelle* in Paris, where they were described by Georges Cuvier and other French ichthyologists. Hugh Cuming, a British collector, obtained Philippine fishes for the British Museum (Natural History) in 1836 to 1839 or 1840, which were published on by Albert Günther (Günther, 1872). George A. Boulenger of the same museum published on Philippine freshwater fishes (Boulenger, 1895). The German collector F. Jagor collected Philippine fishes for the Humboldt Museum in Berlin in 1859 to 1861 which were described by W. Peters (Peters, 1868). A.B. Meyer of Dresden collected extensively at Manila, Santa Cruz, Laguna Province, and Cebu in 1870 and published a list of the Philippine fishes that he collected (Meyer, 1885). Pieter Bleeker, the renowned Dutch ichthyologist, published voluminously on fishes in the Dutch East Indies and Japan, but also wrote a paper on Philippine fishes (Bleeker, 1865). The Spanish researcher José Gogorza y Gonzales published the first checklist of Philippine fishes in Madrid (Gogorza y Gonzales, 1885), a three-page list followed by a more extensive 22 page list published in Manila (Gogorza y Gonzales, 1888). Jan Palacky from Bohemia published "Die Verbreitung der Fische" in Prague (Palacky, 1891, 1895), including a three-page list of Philippine fishes compiled from the available literature.

Dominican friars established a museum at the University of Santo Tomas in Manila (the oldest university in Asia, founded in 1611; see USTM URL 2002 for details) and by the first third of the 19<sup>th</sup> Century had accumulated a considerable collection of fishes, including a stuffed whale shark acquired about 1840. F. Casto de Elera published a 167 page systematic catalog of Philippine fishes in Manila which was based on the specimens and other material at the University of Santo Tomas (Casto de Elera, 1895). Soon after 1865, Jesuit priests also started a museum at their new school, the Ateneo de Manila University in Quezon City, Manila (founded in 1859, see AMU URL 2002 for details), and soon exceeded the collection of fishes at the University of Santo Tomas, but little was added to either collection after 1885 or 1890. Herre (1953) examined the collections of both institutions and talked to the Jesuit priests who had helped build the Ateneo collection. Unfortunately, the Dominicans, Jesuits, and other early researchers based in the Philippines had only Günther's eight-volume *Catalog of Fishes in the British Museum* (Günther, 1859–1870) as a reference, hence there were erroneous records in published checklists by various authors including Gogorza y Gonzales (1885, 1888), Casto de Elera (1895), and Palacky (1891, 1895), based on misidentifications in Philippine collections.

The recolonization or 'reconquest' of the Philippines by U.S. military forces as part of the Spanish–American War brought the Philippines to the attention of the vigorous ichthyological research community of the United States, particularly systematic ichthyologists at the U.S. National Museum of Natural History in Washington, D.C. and David Starr Jordan and his students and colleagues at Stanford University in California. The U.S. Bureau of Fisheries steamer *Albatross* was in Philippine waters from 1907 to 1910 and made enormous collections of fishes, mostly lodged at the U.S. National Museum of Natural History in Washington, DC and partially reported on by various U.S. ichthyologists. Hugh M. Smith and Lewis Radcliffe of the U.S. National Museum and Henry Weed Fowler of the Academy of Natural Sciences in Philadelphia described some of the new sharks from the *Albatross* collections (Smith, 1912a,b,c,d, 1913; Fowler, 1934). Fowler was one of the most prolific ichthyological writers that ever lived (Phillips & Phillips, 1965, Böhlke, 1984, Smith-Vaniz & Peck, 1991), and he (with Barton A. Bean of the U.S. National Museum as a coauthor for the first three volumes) wrote a huge systematic catalog in several volumes on the ichthyofauna of the Philippines, "Fishes of the Philippines and adjacent seas", based primarily on the *Albatross* collections but with 'adjacent seas' extending from South Africa to the Hawaiian Islands! The first seven volumes of this colossal work were published in the multiple volume *Bulletin 100* of the U.S. National Museum dealing with Philippine research (Fowler & Bean, 1928, 1929, 1930, Fowler, 1931, 1933, 1941, 1943) but eight additional volumes in manuscript were not published. Fowler's (1941) sixth volume of the Philippine catalog dealt primarily with cartilaginous fishes in 510 pages of descriptive accounts among 889 pages, including Philippine elasmobranchs

and chimaeroids. It is invaluable as a source-work for Philippine chondrichthology but contains numerous systematic errors, particularly on large-bodied species such as carcharhinid sharks, stingrays, and eagle rays, which reflected the need for further research on the systematics of these animals. Fowler published other papers on Philippine fishes including some that recorded chondrichthyans (Fowler 1918a,b, 1934), and a checklist of sharks and rays of the Pacific Ocean (Fowler, 1930) that included citations of Philippine species. Herre (1953) noted that many place-names given by U.S. researchers for the *Albatross* collections were erroneous because the collectors were unfamiliar with Spanish, Tagalog, Visayan, and other Philippine languages.

Various other ichthyologists made important contributions. Alvin Seale, a U.S. ichthyologist at the Philippine Bureau of Science, made numerous collections of Philippine fishes particularly from Mindoro southwards and published several papers on Philippine fishes. Many of the fishes were painted from life by a Spanish artist. David Starr Jordan & Robert Earl Richardson prepared a checklist of Philippine fishes (Jordan & Richardson, 1910) including 830 species. It was published in Manila and was primarily based on specimens studied and identified by Jordan, Alvin Seale, Richard Crittenden McGregor, Barton Warren Evermann, Richardson, and Albert W. C. T. Herre, supplemented by published records. Hilario A. Roxas and Claro Martin published a checklist of Philippine fishes (Roxas & Martin, 1937), based on published records and specimens (not listed) in Philippine collections. Roxas and Martin listed 1918 species of fishes from the Philippines, but according to Herre (1953), their list omitted many important and common representatives of the Philippine ichthyofauna.

Albert William Christian Theodore Herre was an ichthyologist associated with Stanford University and the University of Washington in the United States, but who traveled extensively in the Western Central Pacific and worked in various Philippine universities and research organisations for many years. Herre collected extensively in the Philippines from 1920 to 1948, deposited major collections of fishes at Stanford and various Philippine institutions including the Philippine Bureau of Sciences in Manila and Silliman University in Dumaguete. He published numerous papers on Philippine fishes from 1923 to at least 1958, including several on Philippine sharks and rays (Herre, 1923, 1925, 1927, 1929, 1930, 1934, 1955, 1958). Herre's contribution to Philippine ichthyology culminated in his 'Checklist of Philippine Fishes' (Herre, 1953) with 2145 species listed and an estimated 2400 species total in the Philippine fauna. Previously Herre, Lucia A. Manikis, and Claro Martin had completed a checklist of Philippine fishes in 1927 including about 1900 species, based on the massive collections made by Herre and Seale, and listing every specimen in their collections. The checklist was to be printed by the Philippine public printer and was in process of publication when Herre took leave in the USA. During this time an official withdrew the manuscript from publication and lost it!

Before World War II Manila had one of the most complete ichthyological libraries in the world at the Philippine Bureau of Sciences, according to Herre (1953), who along with Alvin Seale presumably had a major role in building it over the decades that they worked in the Philippines. The collections, laboratories, and library of the Philippine Bureau of Sciences were completely destroyed by the Japanese occupation during the war, leaving Herre in the position of having to rebuild his checklist in the Philippines with the nearest adequate ichthyological library (presumably the one at the Stanford Natural History Museum) 6000 miles away. As a consequence of this ichthyological holocaust, types of Philippine sharks described by Herre, including *Hemitriakis leucoperiptera* and *Hemigaleus machlani*, were destroyed and along with them valuable voucher specimens for locality records of numerous species of sharks and rays were lost. The loss of these specimens makes for problems in interpretation of Philippine records for several species of elasmobranchs. Herre (1953) gave only patchy references to specimens in his list, and was unable to reconstitute the specimen list from his earlier, lost checklist or from pre-war collections.

Cartilaginous fishes were mostly not given special consideration in previous ichthyological research on Philippine fishes, with the exception of those papers describing new taxa from the *Albatross* collections by Smith, Radcliffe, and Fowler, and papers by Herre based on his own collections and observations. Herre also published reviews of freshwater elasmobranchs and certain groups of marine sharks, and listed Philippine cartilaginous fishes in his 1953 checklist including many previously unpublished records. Herre was primarily focused on the entire Philippine ichthyofauna and was also a world authority on gobies. Biodiversity of Philippine cartilaginous fishes was mostly covered by the process of collection and description of fishes for general ichthyology, and apparently was and still is sketchily understood. This is due largely to the major taxonomic problems that existed within several important groups (including carcharhinoid sharks and myliobatoid rays) that afflicted major works such as Roxas & Martin's (1937) checklist, Fowler's (1941) monograph, and Herre's checklists. Knowledge of the biodiversity of Philippine chondrichthyans was hampered by difficulties in collecting, fixing, preserving and storing specimens due to their large general size and rapid



putrefaction in the tropical heat. Surveys of the region were lacking and there has been inadequate collecting in remote, offshore, and deep-water habitats. There was also limited primary interest in the group due to an initial lack of focus in cartilaginous fishes by ichthyologists, both in the Philippines and internationally, until after World War II and the publication of Herre's ultimate checklist in 1953. The contemporary situation remains unsatisfactory as there is still an absence of Philippine-based, shark researchers (including systematists), and the Philippines has not had a systematic ichthyologist for the last few decades.

The 1950s and early 1960s saw renewed interest in the systematics of cartilaginous fishes, in part stemming from problems with identifying large sharks that occasionally bite people and driven in part by the concerns of the U.S. Navy in protecting personnel who are exposed to sharks. Several important systematic reviews of non-batoid elasmobranchs, primarily carcharhinoids and lamnoids (Compagno, 1970, 1973a, 1979, 1984, 1988; Compagno & Stevens, 1993a,b,c; Garrick 1967a,b, 1982, 1985; Garrick & Schultz, 1963; Gilbert, 1967; Springer, 1979; Springer, 1964; Springer & Garrick, 1964), included records of Philippine specimens, particularly from the Stanford and U.S. National Museum collections. The massive reviews of Western North Atlantic cartilaginous fishes by Henry B. Bigelow and William C. Schroeder (Bigelow & Schroeder, 1948, 1953) included much material of relevance to the Philippine cartilaginous fish fauna, as did their review of the squaloids (Bigelow & Schroeder, 1957). A shark attack panic in South Africa in the 1950s engendered a strong program of shark research, including major taxonomic studies of sharks and rays (Bass, D'Aubrey, & Kistnasamy, 1973, 1975a,b,c,d, 1976; Wallace, 1967a,b,c) that are relevant to the biodiversity of Philippine elasmobranchs.

According to Herre (1953): "It is thus readily seen that a large amount of collecting has been done in Philippine waters during the past 130 years, but the Philippine fish fauna is by no means completely known. The shoreline of the Islands is so extensive and so varied, and the seas about and within them have such strongly contrasting depths, currents, and ecological conditions that a bewildering variety of fish life has developed. As yet we do not have an adequate knowledge of the fresh-water fishes of a single one of the larger islands. This can only be obtained by collecting the fishes from every stream on a given island and from the source of each stream to its mouth...No collecting of fishes has ever been undertaken in certain regions, and a rich harvest awaits the one who collects intensively and extensively in those places. Among the more promising are the islands comprising Batanes Province north of Luzon; the shore of Luzon, from La Union Province north to Bangui, then across the top to Aparri, and southward at least as far as Baler; the east coasts of Samar and Mindanao; the Sarangani Islands and the coast of Cotabato Province from Sarangani Bay to the mouth of the Rio Grande de Mindanao; the Cuyo Islands and the Cagayan Islands; the coasts of Palawan, especially the southwestern part, and of Balabac; the Island of Cagayan Sulu. As a matter of fact, one will be repaid for careful collecting practically anywhere along Philippine coasts...More kinds of fishes have been listed from the Dumaguete area of Negros Oriental Province than from any other one place in the Philippines. This is only partly due to the great richness of the sea around Dumaguete, and the fact that it has been one of the author's favorite collecting grounds for many years. For more than thirty years Dr. James W. Chapman and Prof. Guillermo Magdamo, of Silliman University, have been on the lookout for rarities and have added greatly to our knowledge of Philippine fishes."

Herre (1953) further noted that "The Philippines occupy a strategic position in the geographic distribution of fishes. Of course, the fish fauna in general is strongly East Indian. At the same time, Japanese and Chinese elements are evident, while some fishes of the Hawaiian Islands, the Tonga or Samoan Islands, or the Andamans or Red Sea contribute to the composition of the Philippine fish fauna."

### **Conservation of cartilaginous fishes**

Herre (1958), in a review of marine fishes in Philippine rivers and lakes, noted the decline of sawfish in certain freshwater localities over a twenty-five year period. This was one of the first reports of declines of freshwater elasmobranch populations under pressure from human activities, but it was ignored along with reports of severe declines in marine shark fisheries until the early 1990s (Compagno & Cook, 1995). It is uncertain as to what species of sawfish (Pristidae) and stingrays (Dasyatidae) are or were involved in Philippine freshwater records, and whether records of 'Ganges sharks' from fresh water represented *Glyphis* species, *Carcharhinus leucas*, other carcharhinids, or several species. The WWF project is appropriate and vital for Philippine biodiversity by revealing new records and new species of sharks, for modernizing our conception of the Philippine chondrichthyo-fauna, for repairing gaps in our knowledge of Philippine sharks brought on by war, neglect, lack of interest and limited research, and for highlighting and combating threats to shark biodiversity through burgeoning fisheries and habitat destruction. However, Herre's remarks suggest that some habitats in the

Philippines were not adequately investigated for their cartilaginous fish faunas (particularly rivers and lakes) before overfishing and habitat modification took their toll. Although knowledge of the Philippine fauna is still in a stage of discovery and growth, the fauna itself faces serious conservation problems. The IUCN Red List 2003 (IUCN Red List URL, 2004) includes 56 Philippine species (Table 1). Additional species may be added as levels of depletion become better understood.

**Table 1. Philippine elasmobranchs on the IUCN Red List, 2003.**

No.	Scientific Name	Common Name	Red List Ranking	Population
1	<i>Aetobatus narinari</i>	Spotted eagle ray	DD	Unknown
2	<i>Aetomylaeus nichofii</i>	Banded eagle ray	VU A2d+3d+4d	Decreasing
3	<i>Alopias vulpinus</i>	Thresher shark	DD	Unknown
4	<i>Anoxypristis cuspidata</i>	Knifetooth sawfish	EN A1acde+2cde	Decreasing
5	<i>Atelomycterus marmoratus</i>	Coral catshark	NT	Unknown
6	<i>Carcharhinus amblyrhynchoides</i>	Graceful shark	LR/nt	Unknown
7	<i>Carcharhinus amblyrhynchos</i>	Grey reef shark	LR/nt	Unknown
8	<i>Carcharhinus borneensis</i>	Borneo shark	EN C2b	Unknown
9	<i>Carcharhinus brevipinna</i>	Spinner shark	LR/nt	Unknown
10	<i>Carcharhinus dussumieri</i>	Whitecheek shark	NT	Decreasing?
11	<i>Carcharhinus hemiodon</i>	Pondicherry shark	CR A2acd; C2a(1)	Unknown
12	<i>Carcharhinus leucas</i>	Bull shark	LR/nt	Unknown
13	<i>Carcharhinus limbatus</i>	Blacktip Shark	LR/nt	Unknown
14	<i>Carcharhinus longimanus</i>	Oceanic whitetip shark	LR/nt	Unknown
15	<i>Carcharhinus macroti</i>	Hardnose shark	NT	Unknown
16	<i>Carcharhinus melanopterus</i>	Blacktip reef shark	LR/nt	Unknown
17	<i>Carcharhinus sealei</i>	Blackspot shark	NT	Unknown
18	<i>Centrophorus moluccensis</i>	Smallfin gulper shark	DD	Decreasing
19	<i>Centrophorus squamosus</i>	Leafscale gulper shark	VU A2bd+3bd+4bd	Decreasing
20	<i>Carcharodon carcharias</i>	Great white shark	VU A1bcd+2cd	Unknown
21	<i>Chiloscyllium griseum</i>	Grey bamboo shark	NT	Unknown
22	<i>Chiloscyllium indicum</i>	Slender bamboo shark	NT	Unknown
23	<i>Chiloscyllium punctatum</i>	Brownbanded bamboo shark	NT	Decreasing
24	<i>Centroscyllium kamoharai</i>	Bareskin dogfish	DD	Unknown
25	<i>Cetorhinus maximus</i>	Basking shark	VU A1ad+2d	Unknown
26	<i>Echinorhinus cookei</i>	Prickly shark	NT	Unknown
27	<i>Galeocerdo cuvier</i>	Tiger shark	LR/nt	Unknown
28	<i>Glaucostegus typus</i>	Giant shovelnose ray	VU A2bd+3bd+4bd	Decreasing
29	<i>Glyphis gangeticus</i>	Ganges shark	CR A1cde+2cde, C2b	Unknown?
30	<i>Hemipristis elongatus</i>	Snaggletooth shark	VU A2bd+3bd+4bd	Decreasing
31	<i>Hemirhamphys leucopripta</i>	Whitfin tope shark	EN B1+2ce, C2b	Unknown
32	<i>Heptranchias perlo</i>	Sharpnose sevengill shark	NT	Unknown

No.	Scientific Name	Common Name	Red List Ranking	Population
33	<i>Hexanchus griseus</i>	Bluntnose sixgill shark	LR/nt	Unknown
34	<i>Isurus oxyrinchus</i>	Shortfin mako	LR/nt	Unknown
35	<i>Manta birostris</i>	Manta ray	DD	Unknown
36	<i>Megachasma pelagios</i>	Megamouth shark	DD	Unknown
37	<i>Mobula eregoodootenkee</i>	Longfin devilray	NT	Unknown
38	<i>Nebrius ferrugineus</i>	Tawny nurse shark	VU A2abcd+3cd+4abcd	Decreasing
39	<i>Negaprion acutidens</i>	Sharptooth lemon shark	VU A2abcd+3bcd+4abcd	Decreasing
40	<i>Prionace glauca</i>	Blue shark	LR/nt	Unknown
41	<i>Pristis microdon</i>	Freshwater sawfish (Asia)	CR A1abc+2cd	Decreasing
42	<i>Pristis pectinata</i>	Smalltooth sawfish	EN A1bcd+2cd	Unknown
43	<i>Pristis zijsron</i>	Green sawfish	EN A1bcd+2cd	Decreasing
44	<i>Pseudocarcharias kamoharai</i>	Crocodile shark	LR/nt	Unknown
45	<i>Rhina ancylostoma</i>	Shark ray	VU A2bd+3bd+4bd	Decreasing
46	<i>Rhincodon typus</i>	Whale shark	VU A1bd+2d	Decreasing
47	<i>Rhynchobatus australiae</i>	White-spotted wedgefish	VU A2bd+3bd+4bd	Decreasing
48	<i>Rhynchobatus laevis</i>	Smoothnose wedgefish	VU A2bd+3bd+4bd	Decreasing
49	<i>Scoliodon laticaudus</i>	Spadenose shark	LR/nt	Unknown
50	<i>Sphyrna lewini</i>	Scalloped hammerhead	LR/nt	Unknown
51	<i>Sphyrna mokarran</i>	Great hammerhead	DD	Unknown
52	<i>Sphyrna zygaena</i>	Smooth hammerhead	LR/nt	Unknown
53	<i>Stegostoma fasciatum</i>	Zebra shark	VU A2abcd+3cd+4abcd	Decreasing
54	<i>Taeniura lymma</i>	Bluespotted ribbontail ray	LR/nt	Unknown
55	<i>Triaenodon obesus</i>	Whitetip reef shark	LR/nt	Unknown
56	<i>Urogymnus asperrimus</i>	Porcupine ray	VU A1bd, B1+2bcd	Unknown

Red-Listed Philippine cartilaginous fishes are summarized by ranking in Table 2. Of the 56 Philippine species Listed in the 2003 list, three are Critically Endangered, five are Endangered, and fourteen are Vulnerable. The methodology of Red Listing (IUCN, 2001; IUCN Red List URL, 2004) is applicable to shark-like fishes although with some difficulties. The major problem is inadequate data on the population biology of most shark-like fishes, which engenders neglect as well as resistance by some marine biologists and fisheries people to certain forms of international protection such as IUCN and CITES listing. It is anticipated that most if not all Philippine cartilaginous fishes will be assessed for Red Listing by 2005 as part of an ongoing IUCN Species Survival Commission project conducted by the IUCN Shark Specialist Group to assign ranking to all species of living cartilaginous fishes, and that rankings for presently Listed Philippine species will be modified or changed as knowledge of their status increases.

**Table 2. Summary of Philippine Red-Listed cartilaginous fishes by category.**

Red List Ranking	No. of species
Data Deficient (DD)	7
Lower Risk/Near Threatened (LR/nt)	27
Critically Endangered (CR)	3
Endangered (EN)	5
Vulnerable (VU)	14
<b>Total species</b>	<b>56</b>

In addition, three species of sharks that occur in Philippine seas are currently listed in Appendix II of the Convention on International Trade in Endangered Species (CITES). The whale shark (*Rhincodon typus*) and basking shark (*Cetorhinus maximus*) were listed on CITES in 2002, and the white shark (*Carcharodon carcharias*) was recently listed in 2004 (see CITES URL 2004, for details).

### Growth of the listed fauna

Knowledge of the chondrichthyan fauna of the Philippines has lagged behind knowledge of the faunas of Europe, North America, Japan, Australia, and South Africa (Last & Stevens, 1994, Compagno, 2000). The number of species recorded in the Philippines only began to expand greatly in the last half of the 20<sup>th</sup> Century, and it is significant, and rather startling, that the WWF elasmobranch project reported over twice the number of species recorded by Herre (1953) without a massive investment in collection of offshore habitats. Table 3 shows the number of cartilaginous fish species reported by Gogorza y Gonzales (1885, 1888), Meyer (1885), Palacky (1891), Casto de Elera (1895), Jordan & Richardson (1910), Fowler (1930), Roxas & Martin (1937), Fowler (1941), Herre (1953), and the present checklist.

**Table 3. Growth of the listed Philippine chondrichthyan fauna.**

Author	Year	No. of species
Gogorza y Gonzales	1885	3
Meyer	1885	3
Gogorza y Gonzales	1888	7
Palacky	1891	4
Casto de Elera	1895	28
Jordan & Richardson	1910	11
Fowler	1930	14
Roxas & Martin	1937	46
Fowler	1941	45
Herre	1953	77
Present checklist	2004	164

### Classification of the fauna

Cartilaginous fishes are divided into two subclasses, Elasmobranchii (sharks and rays) and Holocephalii (chimaeras). The synthetic classification used here follows Compagno (2000). The major features of the synthetic classification include the subdivision of the living elasmobranch fishes or neoselachians into two superorders, Galeomorphii and Squalomorphii. The Galeomorphii includes four orders, the Heterodontiformes (bullhead sharks), Lamniformes (mackerel sharks), Orectolobiformes (carpet sharks), and Carcharhiniformes (ground sharks), and the Squalomorphii the Hexanchiformes (cow and frilled sharks), Squaliformes (dogfish

sharks), Squatiniformes (angel sharks), Pristiophoriformes (sawsharks), and Rajiformes (batoids). Previously, living elasmobranchs were usually subdivided into two major groups, Selachii (sharks) and Batoidea (rays), but phyletic studies suggest that the batoids are best included as a large and diverse order of 'flat sharks' (Rajiformes) within the Squalomorphii. The Rajiformes is the immediate sister group of the Pristiophoriformes and with them forms the sister group of the Squatiniformes.

Representatives of all 10 orders of cartilaginous fishes, 44 of 58 of the families (76%), 83 out of 189 genera (44%), and between about 129 valid species and 35 doubtful species for a possible total of 164 species, are currently known from the Philippines (Table 4). This is about 14% of the approximately 1182 world species (L. Compagno checklist updated November 8, 2004), with relative numbers of species roughly as in the world fauna but with interesting differences. The Philippines has less chimaeroids, rhinobatoids, torpedinoids, and rajoids (skates), and more lamnoids, orectoloboids, carcharhinoids, hexanchoids, pristoids, rhynchobatoids, and myliobatoids than the world fauna (Table 4), with others groups approximately equal or not comparable (eg. one species of rhinoid world-wide, and no zanobatoids in the Philippines). The batoids (Rajiformes) are the largest order of sharklike fishes, but are far fewer in relative numbers off the Philippines (40%) than in the world fauna, in which batoids outnumber other chondrichthyans (55%).

**Table 4. Comparison of relative numbers of species of the Philippine and world chondrichthyan faunas by higher group.**

Higher groups	Philippines	%	Comparison	World	%
<b>Total species:</b>	<b>164</b>	<b>100</b>	<b>Phil:World</b>	<b>1182</b>	<b>100</b>
Order Chimaeriformes	3	1.8	<	47	4.0
Order Heterodontiformes	1	0.6	=	9	0.8
Order Lamniformes	9	5.5	>	15	1.3
Order Orecolobiformes	10	6.1	>	34	2.9
Order Carcharhiniformes	52	31.7	>	282	23.9
Order Hexanchiformes	3	1.8	>	6	0.5
Order Squaliformes	17	10.4	=	113	9.6
Order Squatiniformes	2	1.2	=	20	1.7
Order Pristiophoriformes	1	0.6	=	9	0.8
Order Rajiformes	66	40.2	<	647	54.7
Suborder Pristoidei	4	2.4	>	7	0.6
Suborder Rhinoidei	1	0.6		1	0.1
Suborder Rhynchobatoidei	3	1.8	>	6	0.5
Suborder Rhinobatoidei	5	3.0	<	51	4.3
Suborder Platyrrhinoidei	1	0.6		3	0.3
Suborder Zanobatoidei	0	0.0		2	0.2
Suborder Torpedinoidei	6	3.7	<	79	6.7
Suborder Rajoidei	12	7.3	<	290	24.5
Suborder Myliobatoidei	34	20.7	>	208	17.6

The analysis can be taken further by comparing the relative numbers of species of Philippine and world chondrichthyans by family (Table 5). This suggests that knowledge of the Philippine chondrichthyofauna is biased toward inshore families such as Dasyatidae and Carcharhinidae, with the deep fauna (including deepwater skates and squaloids) relatively poorly known and likely to increase in numbers with further exploration. There are many species of cartilaginous fishes currently known from adjacent areas of the South China Sea that are likely to be recorded in the Philippines. Several undescribed species were discovered by the

WWF biodiversity project along with many new records, and there is every likelihood that more undescribed species and new records will turn up in future exploration. Table 5 can be used as an indicator of what to expect for future records, particularly to suggest that certain wide-ranging families currently not recorded from Philippines, including Odontaspidae (*Odontaspis*), may occur there, as well as additions to families such as Rajidae that currently seem under-represented in Philippine waters.

**Table 5. Comparison of relative numbers of species of the Philippine and world chondrichthyan faunas by family.**

<b>Families</b>	<b>Philippines</b>	<b>%</b>	<b>Comparison</b>	<b>World</b>	<b>%</b>
<b>Total species:</b>	<b>160</b>	<b>100</b>	<b>Phil:World</b>	<b>1170</b>	<b>100</b>
Alopiidae	3	1.8	>	3	0.3
Brachaeluridae	0	0.0		2	0.2
Callorhynchidae	0	0.0		3	0.3
Carcharhinidae	24	14.6	>	54	4.6
Centrophoridae	6	3.7	>	15	1.3
Cetorhinidae	1	0.6		1	0.1
Chimaeridae	3	1.8	<	36	3.0
Chlamydoselachidae	0	0.0		2	0.2
Dalatiidae	3	1.8	>	10	0.8
Dasyatidae	18	11.0	>	77	6.5
Echinorhinidae	1	0.6	>	2	0.2
Etmopteridae	3	1.8	<	44	3.7
Ginglymostomatidae	1	0.6	>	3	0.3
Gymnuridae	3	1.8	>	12	1.0
Hemigaleidae	2	1.2	>	9	0.8
Hemiscylliidae	4	2.4	>	13	1.1
Heterodontidae	1	0.6	=	9	0.8
Hexanchidae	3	1.8	>	4	0.3
Hexatrygonidae	1	0.6		1	0.1
Hypnidae	0	0.0		1	0.1
Lamnidae	3	1.8	>	5	0.4
Leptochariidae	0	0.0		1	0.1
Megachasmidae	1	0.6	>	1	0.1
Mitsukurinidae	0	0.0		1	0.1
Mobulidae	4	2.4	>	10	0.8
Myliobatidae	6	3.7	>	22	1.9
Narcinidae	2	1.2	<	35	3.0
Narkidae	2	1.2	<	12	1.0
Odontaspidae	0	0.0		3	0.3
Orectolobidae	2	1.2	>	7	0.6
Oxynotidae	0	0.0		5	0.4
Parascylliidae	1	0.6	=	7	0.6
Platyrrhinidae	1	0.6		3	0.3

Families	Philippines	%	Comparison	World	%
Plesiobatididae	1	0.6		1	0.1
Potamotrygonidae	0	0.0		29	2.5
Pristidae	4	2.4	>	7	0.6
Pristiophoridae	1	0.6	=	9	0.8
Proscylliidae	2	1.2	>	6	0.5
Pseudocarchariidae	1	0.6		1	0.1
Pseudotriakidae	1	0.6		5	0.4
Rajidae	12	7.3	<	290	24.5
Rhincodontidae	1	0.6		1	0.1
Rhinidae	1	0.6		1	0.1
Rhinobatidae	5	3.0	<	51	4.3
Rhinochimaeridae	0	0.0	<	8	0.7
Rhinopteridae	1	0.6	=	11	0.9
Rhynchobatidae	3	1.8	>	6	0.5
Scyliorhinidae	11	6.7	<	151	12.8
Somniosidae	0	0.0	<	18	1.5
Sphyrnidae	5	3.0	>	9	0.8
Squalidae	4	2.4	>	19	1.6
Squatinidae	2	1.2	=	20	1.7
Stegostomatidae	1	0.6		1	0.1
Torpedinidae	2	1.2	<	31	2.6
Triakidae	7	4.3	>	47	4.0
Urotrygonidae	0	0.0		16	1.4
Urolophidae	0	0.0	<	29	2.5
Zanobatidae	0	0.0		2	0.2

### Distribution patterns in the fauna

The Philippine chondrichthyan fauna is zoogeographically complex and includes a variety of unique species, including Philippine endemics (8.5%) and regional endemics from the South China Sea (2.4%), Western North Pacific (4.9%) and Western Pacific (18.3%), as well as more wide-ranging species. The region is a center of endemism for a variety of taxa, most notably members of the catsharks (Family Scyliorhinidae) houndsharks (Triakidae), sawsharks (Pristiophoridae), dogfishes (Squaliformes), and skates (Rajoidei). Many species are wide-ranging (23.8%) and Indo–West Pacific (37.2%) species. There are lesser contributions from other areas (Table 6).

**Table 6. Distributional affinities of Philippine cartilaginous fishes.**

<b>Distribution Pattern</b>	<b>No. of species</b>	<b>%</b>
Indo–West Central Pacific endemic	2	1.2
Indo–Pacific endemic	2	1.2
Indo–West Pacific endemic	61	37.2
Philippine endemic	14	8.5
South China Sea endemic	4	2.4
West Central Pacific endemic	3	1.8
Western North Pacific endemic	8	4.9
Western Pacific endemic	30	18.3
Wide-ranging	39	23.8
Western Hemisphere?	1	0.6

### **Habitat patterns in the fauna**

Cartilaginous fishes are broadly divisible by habitat into species of the *continental shelves* from the intertidal to about 200 m, the *continental slopes* below 200 m to the ocean floor, and the *oceanic zone* beyond the shelves and above the slopes and sea bottom. Habitat categories with number of Philippine species are listed in Table 7. The Philippine shelf fauna is the largest habitat category, while the slope fauna is comparatively undiverse (which probably reflects inadequate sampling). Very few Philippine cartilaginous fishes are oceanic, reflecting the low diversity of world cartilaginous fishes in the oceanic zone. A few large sharks including the blunt-nosed sixgill and white sharks have a wide range of habitats, and occur oceanically, on the slopes, and inshore. Some shelf species favor muddy bays or sandy beaches, while others favor coral or rocky reefs.

**Table 7. Habitat categories of Philippine cartilaginous fishes.**

<b>Habitat</b>	<b>No. of species</b>	<b>%</b>
Freshwater obligate	0	0.0
Oceanic	6	3.7
Freshwater euryhaline	5	3.0
Continental/insular shelves	87	53.0
Shelf to oceanic	8	4.9
Shelf to slope	24	14.6
Continental/insular slopes	25	15.2
Slope to oceanic	0	0.0
Shelf to semioceanic	7	4.3
Wide range of habitats	2	1.2



## CHECKLIST OF PHILIPPINE CARTILAGINOUS FISHES

### **Class Chondrichthyes Huxley, 1880. Cartilaginous fishes.**

[Evolutionary group] Chondrichthyes Huxley, 1880, Proc. Zoo. Soc. London 1880, 660, 661, 662.

### **Subclass Holocephalii Müller, 1835. Chimaeroids and their relatives.**

Order Holocephala Müller, 1835, Vergl. Anat. Myxinoiden (1): 10.

### **Order Chimaeriformes Garman, 1877. Modern chimaeras or silver sharks.**

Order Chimaerae Garman, 1877, Proc. Boston Soc. Nat. Hist. 19: 198.

### **Family Chimaeridae Rafinesque, 1815. Shortnose chimaeras.**

Subfamily Chimaeria Rafinesque, 1815, Anal. Nature: 92 (Family Branchismea Rafinesque, 1815).

### **Genus *Chimaera* Linnaeus, 1758**

Genus *Chimaera* Linnaeus, 1758, Syst. Nat., Ed. 10, 1: 236. No type designated. Type species: *Chimaera monstrosa* Linnaeus, 1758, by Linnaean tautonomy.

### ***Chimaera phantasma* Jordan & Snyder, 1900. Silver chimaera.**

*Chimaera phantasma* Jordan & Snyder, 1900, Proc. U.S. Nat. Mus. 23(1213): 338. Holotype: U.S. National Museum of Natural History, USNM-49398, 520 mmPCL immature male, from Tokyo Bay, Japan.

**References:** *Chimaera phantasma*: Smith, 1912a: 231. Specimens from RV *Albatross* collections, in U.S. National Museum of Natural History, from Philippines. Roxas & Martin, 1937: 17. Philippines. Fowler, 1941: 491, same material as Smith (1912a). Herre, 1953: 54. Philippines from off Matoco Pt, Batangas Province, Luzon; Point Tagolo Light, Zamboanga Province, Mindanao; off Jolo Light, Jolo, Sulu Province Bigelow & Schroeder, 1953: 527. In key to species. Compagno, 1999: 1536, ill. Western Central Pacific, including Philippines.

**Philippine material:** Specimen in FishBase database, MUSOSTROM 2, Sta. 82, female 81 cm, 550 m, 13°46'N, 120°28'E, 2/12/1980. Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-02-95, 19950923, 363–385 m, 13°08.98–09.84'N, 124°04.72–00.01'E, 2 specimens: immature male, 508 mm TL, 334 mm snout–upper caudal insertion, 275 mm PCL; immature male, 333 mm TL, 230 mm snout–upper caudal insertion, 187 mm PCL; FR1-PHI-14-95, 19950927, 435–451 m, 14°41.07–42.42'N, 123°24.12–21.42'E, 3 specimens: immature or adolescent male, 566 mm TL, 475 mm snout–upper caudal insertion, 461 mm PCL; immature female, 896 mm TL, 632 mm snout–upper caudal insertion, 508 mm PCL; immature female, 843 mm TL, 581 mm snout–upper caudal insertion, 463 mm PCL, at South African Museum. 14 whole, 1 with missing right eye and dorsal spine, Bukana, Sikayab and Pasil, Polo, Dapitan City; Pasil Fish Port I, Cebu City; Dipolog Market, Dipolog City; Escano Beach, Piapi, Dumaguete City; Punta Miray, Baliangao, JPAG 112, immature male, 510 mm TL, April 17, 1999; JPAG 250, female, 847 mm TL, March 29, 2000; JPAG 251, female, 843 mm TL, March 29, 2000; JPAG 141, immature male, 495 mm TL, April 17, 1999; JPAG 312, mature male, 754 mm TL, April 11, 2000; JPAG 313, female, 808 mm TL, April 11, 2000; JPAG 080, mature male, 777 mm TL, April 9, 1999; JPAG 081, mature male, 681 mm TL, April 9, 1999; JPAG 059, mature male, 678 mm TL, April 8, 1999; MMLM 016, female, 932 mm TL, June 23, 1999; BRU 128, female, 715 mm TL, March 25, 2000; BRU 129, immature male, 730 mm TL, March 25, 2000; JPAG 241, female, 839 mm TL, March 25, 2000; JPAG 242, mature male, 799 mm TL, March 25, 2000; BRU 142, female, 1,040 mm TL, March 28, 2000.

**Remarks:** Widespread in the region. Close comparison with material from Japanese populations is needed to confirm the existence of a single western North Pacific *Chimaera*.

**Genus *Hydrolagus* Gill, 1863.**

Genus *Hydrolagus* Gill, 1863, Proc. Acad. Nat. Sci. Philadelphia, 14: 331. Type species: *Chimaera colliei* Lay & Bennett, 1839, by monotypy.

***Hydrolagus mitsukurii* (Dean, in Jordan & Snyder, 1904). Mitsukurii's chimaera.**

*Chimaera mitsukurii* Dean, in Jordan & Snyder, 1904, Proc. U.S. Natl. Mus., 27 (1356): 224, fig. 2. Holotype: Division of Systematic Biology, Stanford University, SU 7739, Japan, according to Eschmeyer (1998, Catalog of Fishes, CD-ROM); possibly lost or misplaced.

*Chimaera mitsukurii* Dean, 1904, J. Coll. Sci. Imp. U. Tokyo, 19(3): 6, pl. 1, fig. 1. Holotype: Tokyo University Museum, ZUMT 1457, adult male, 600 mm TL(?), off Misaki, Japan, ca. 550 m. Status uncertain according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

*Chimaera deani* Smith & Radcliffe, in Smith, 1912a, Proc. U.S. Natn. Mus. 42(1899): 232, pl. 29. Holotype: U.S. National Museum of Natural History, USNM-72284, 43 cm TL, 195 mm PCL female, from 13°45'N, 120°46'E, off Sombrero Is., W. coast of Luzon, 432 m.

**References:** *Chimaera daeni*: Roxas & Martin, 1937: 17. Philippines. *Chimaera deani*: Fowler, 1941: 500. Holotype. Herre, 1953: 54. Holotype. *Hydrolagus deani*: Bigelow & Schroeder, 1953: 536. In key to species. Compagno, 1999: 1537, ill. Western Central Pacific, including Philippines.

**Philippines material:** Adult male possibly in MRI or Zoology Department collection, drawing at MRI. This may or may not be the same as the specimen listed in the FishBase database, MUSOSTROM Sta. 43, CP 5, female 61 cm TL, 484 m, 13°50'N, 120°28'E, 24/3/1976. Also Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-12-95, 19950927, 760–770 m, 14°50.46–49.38'N, 123°17.30–22.33'E, adult female, 672 mm TL, 478 mm snout–upper caudal insertion, 405 mm PCL, at South African Museum.

**Remarks:** Not observed by WWF project except for examination of specimen by L. Compagno. *Hydrolagus deani* was formerly recognized as an endemic Philippine species, but it is now considered a synonym of the Japanese *H. mitsukurii* (D. Didier-Dagit (pers. comm. to R. Cavanagh, 2002 for IUCN Red Book). According to Eschmeyer (1998), *Chimaera mitsukurii* was essentially described twice, with the formal description by Dean (1904) preceded by Jordan & Snyder's (1904) account using Dean's name. The two accounts of *C. mitsukurii* had different type specimens.

***Hydrolagus* sp. 1. Philippines reticulate chimaera.**

**Philippine material:** 2 whole, Dipolog Public Market; Bukana, Sikayab, Dapitan City, JPAG 058, mature male, 648 mm TL, April 8, 1999; JPAG 111, immature male, 547 mm TL, April 17, 1999.

**Remarks:** Possibly an undescribed species and differs in morphology from *Hydrolagus* sp. B (Last & Stevens, 1994) from Australia. This group is under review by D. Didier-Dagit.

**Subclass Elasmobranchii Müller, 1845. Shark-like fishes.**

Class Pisces, Subclass Elasmobranchii: Müller, 1845, Arch. Naturg. 11(1): 137.

**Superorder Galeomorphii Compagno, 1973. Galeomorph sharks.**

Superorder Galeomorphii Compagno, 1973c, J.Linn.Soc.(Zool.), 53, suppl. 1: 28.

**Order Heterodontiformes Garman, 1885. Bullhead sharks.**

[group] Heterodonti Garman, 1885, Bull. Mus. Comp. Zool. Harvard 12(1): 30.

**Family Heterodontidae Gray, 1851. Bullhead sharks.**

Tribe Heterodontina Gray, 1851, List Fish British Mus., Pt. 1, Chondropterygii, British Mus. (Nat. Hist.): 65 (Family Squalidae). Type genus: *Heterodontus* Blainville, 1816.

**Genus *Heterodontus* Blainville, 1816. Bullhead sharks.**

Subgenus *Heterodontus* Blainville, 1816 (Genus *Squalus* Linnaeus, 1758), Bull. Sci. Soc. Philomat. Paris, (8): 121. Type species: '*Philippi*' = *Squalus philippi* Bloch & Schneider, 1801, by monotypy, a junior synonym of *Squalus portusjacksoni* Meyer, 1793.

***Heterodontus zebra* (Gray, 1831). Zebra bullhead shark.**

*Centracion zebra* Gray, 1831, Zool. Misc.: 5. Holotype: British Museum (Natural History), BMNH 1953.5.10.4, dry specimen, female about 47 cm, from Swatow, China.

**References:** *Heterodontus zebra*: Fowler, 1941: 22. No Philippine records. Compagno, 1984: 164, ill. No Philippine records. Last & Stevens, 1994: 115, fig, pl. 2. Distribution, including Philippines. Compagno & Niem, 1998: 1239–1240, fig. 2. Western Central Pacific, no Philippine records. Compagno, 2001: 48, fig. 40. No Philippine records.

**Philippine material:** 1 without first dorsal fin, Pasil Fish Port I, Cebu City, JPAG 325, mature male, 674 mm TL, April 12, 2000.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 325, male, in photo catalogue agrees with descriptions in cited references.

**Order Lamniformes Garman, 1885. Mackerel sharks.**

[group] Lamnae Garman, 1885, Bull. Mus. Comp. Zool. Harvard 12(1): 30.

**Family Pseudocarchariidae Compagno, 1973. Crocodile sharks.**

Family Pseudocarchariidae Compagno, 1973c, J. Linn. Soc.(Zool.), 53, suppl. 1: 28. Type genus: *Pseudocarcharias* Cadenat, 1963.

**Genus *Pseudocarcharias* Cadenat, 1963. Crocodile sharks.**

Subgenus *Pseudocarcharias* Cadenat, 1963 (Genus *Carcharias* Rafinesque, 1810), Bull. Inst. Francaise Afrique Noire, ser. A, 25(2): 526 (proposed as a subgenus of *Carcharias* Rafinesque, 1810, but used throughout in generic form). Type species: *Pseudocarcharias pelagicus* Cadenat, 1963, by original designation, a junior synonym of *Carcharias kamoharai* Matsubara, 1936.

**?*Pseudocarcharias kamoharai* (Matsubara, 1936). Crocodile shark.**

*Carcharias kamoharai* Matsubara, 1936, Zool. Mag. Tokyo, 48(7): 380. Holotype: Imperial Fisheries Institute, Japan, Kyoto University, Department of Fisheries, Faculty of Agriculture, Japan (collection housed at Maizuru, Japan) FAKU, Fish Spec. 1823, 735 mm TL male, Koti Fish Market, Koti, Japan, apparently lost according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Carcharias kamoharai*: Bass, D'Aubrey & Kistnasamy, 1975c: 8. Morphology. *Pseudocarcharias kamoharai*: Compagno, 1984: 225, fig. No Philippine records, but present in adjacent areas. Last & Stevens, 1994: 159, fig, pl. 14. Distribution, no Philippine records. Compagno & Niem, 1998: 1268, fig. Western Central Pacific, no Philippine records. Compagno, 2001: 72, fig. 58. No specific Philippine records.

**Philippine material:** None.

**Remarks:** Known from Taiwan (Teng, 1959a, 1962) and off eastern Indonesia (W. White, pers. comm.) but apparently not yet recorded from the Philippines. Likely to occur in benthopelagic habitats along the upper continental slopes of the region.

**Family Megachasmidae Taylor, Compagno & Struhsaker, 1983. Megamouth sharks.**

Family Megachasmidae Taylor, Compagno & Struhsaker, 1983, Proc. California Acad. Sci., ser. 4, 43(8):87, 89. Type genus: *Megachasma* Taylor, Compagno & Struhsaker, 1983.

**Genus *Megachasma* Taylor, Compagno & Struhsaker, 1983. Megamouth sharks.**

Genus *Megachasma* Taylor, Compagno & Struhsaker, 1983, Proc. California Acad. Sci., ser. 4, 43(8):87, 96. Type species: *Megachasma pelagios* Taylor, Compagno & Struhsaker, 1983, by original designation.

***Megachasma pelagios* Taylor, Compagno & Struhsaker, 1983. Megamouth shark.**

*Megachasma pelagios* Taylor, Compagno & Struhsaker, 1983, Proc. California Acad. Sci., ser. 4, 43(8): 87, 96, figs. 1–15. Holotype: Bernice P. Bishop Museum, BPBM–22730, 4460 mm adult male, off Oahu, Hawaiian Islands, 21°51'N, 157°46'W, about 42 km northeast of Kahuku Point, at 165 m depth in water about 4600 m deep.

**References:** Last & Stevens, 1994: 152, fig, pl. 13. Distribution, no Philippine records. Compagno, 2001: 75, fig. 79. Philippine record.

**Philippine material:** Photographs of a 5.49 m male megamouth shark caught by fishermen on February 21, 1998 in Macajalar Bay, about 6 km NW of Puerto, Cagayan de Oro, est. 8°32'N, 124°38'E, were supplied to L. Compagno by Mr. Elson T. Elizaga and also published on the World Wide Web. The shark was cut up and consumed by local fishers, and nothing of the shark was saved. A second, large, female megamouth shark was caught in a gill net off Tablon, Cagayan de Oro City, Philippines, on January 6, 2003. This was photographed and cut up by the fishermen who caught it. Reported by Edward B. Yasay ([ebyasay@yahoo.com](mailto:ebyasay@yahoo.com)), Bureau of Fisheries and Aquatic Resources—Regional Office 10, to Marie Levine ([marie@sharks.org](mailto:marie@sharks.org)) and to L. Compagno. Photos of this shark were sent to L. Compagno and are unmistakable. The state of maturity was uncertain, but the female had apparent courtship bite marks on her caudal peduncle and around her pelvic fins. More recently (November 4, 2004) a third megamouth shark stranded on the beach of Barangay Namocin in Tigbauan, Iloilo, Philippines and was reported by T.U Bagarinao, the curator of SEAFDEC FishWorld, SEAFDEC Aquaculture Department in Tigbauan ([dorisb@aqd.seafdec.org.ph](mailto:dorisb@aqd.seafdec.org.ph)). The 5.04 m shark was preserved intact (AQDM2004) in the fish collection of FishWorld.

**Remarks:** The above specimens are the first three records from the Philippines.

**Family Alopiidae Bonaparte, 1838. Thresher sharks.**

Subfamily Alopiadini Bonaparte, 1838 (Family Squalidae), Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 209. Type genus: *Alopias* Rafinesque, 1810.

**Genus *Alopias* Rafinesque, 1810. Thresher sharks.**

Genus *Alopias* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 13. Type species, *Alopias macrourus* Rafinesque, 1810, by monotypy, a junior synonym of *Squalus vulpinus* Bonnaterre, 1788.

**Remarks:** Fowler (1941) and Herre (1953) had no Philippine records of thresher sharks.

***Alopias pelagicus* Nakamura, 1935. Pelagic thresher.**

*Alopias pelagicus* Nakamura, 1935, Mem. Fac. Sci. Agric. Taihoku Imp. Univ. 14(1): 2, 3, pl. 1, fig. 1. 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 fetus 965 mm (Nakamura, *ibid.*, 5, pl. 3), probably referable to *Alopias vulpinus*; all from Suô fish market, Taiwan.

**References:** Bass, D'Aubrey & Kistnasamy, 1975c: 34. Nomenclature. Compagno, 1984: 229, fig. Distribution, no Philippine records, present in adjacent areas. Last & Stevens, 1994: 155, fig, pl. 12. Distribution, no Philippine records. Compagno & Niem, 1998: 1271, fig. Western Central Pacific, no Philippine records. Compagno, 2001: 81, fig. 64. No Philippine records.

**Philippine material:** 1 whole, Palapala Fish Port, Cadiz City; Pasil Fish Port I, Cebu City, BRU 155, female, 1,580 mm TL, April 6, 2000; JPAG 275, male, 2,890 mm TL, April 6, 2000.

**Remarks:** First record from the Philippines. Collected by WWF elasmobranch biodiversity project. JPAG 275, adult male, in photo catalogue agree with description in cited references.

***Alopias superciliosus* (Lowe, 1839). Bigeye thresher.**

*Alopias superciliosus* Lowe, 1839, Trans. Zool. Soc. London, 3(1): 18; also Lowe, 1841, Proc. Zool. Soc. London 1840(8): 39. Holotype unknown, type locality Madeira, Eastern Atlantic.

**References:** *Alopias superciliosus*: Bigelow & Schroeder, 1948: 163, figs. 25–26. General, review of literature. Bass, D'Aubrey & Kistnasamy, 1975c: 38. Systematics. Compagno, 1984: 231, fig. No Philippine records, present in adjacent areas. Last & Stevens, 1994: 156, fig, pl. 12. No Philippine records. Compagno & Niem, 1998: 1272, fig. Western Central Pacific, no Philippine records. Compagno, 2001: 83, fig. 65. No specific Philippine records.

**Philippine material:** 1 head, Jose Dalman Public Market, JPAG 249, male, unknown TL, March 28, 2000.

**Remarks:** First record from the Philippines collected by WWF elasmobranch biodiversity project. Identified from photo catalogue which agrees with description in cited references.

***Alopias vulpinus* (Bonnaterre, 1788). Thresher shark.**

*Squalus vulpinus* Bonnaterre, 1788, Tabl. Encyclop. Method. Trois Reg. Nat., Ichthyol., Paris: 9. Types unknown according to Eschmeyer (1998, Catalog of Fishes, CD-ROM), type locality, Mediterranean Sea.

**References:** *Alopias vulpinus*: Bigelow & Schroeder, 1948: 167, figs. 27–28. General, review of literature. Bass, D'Aubrey & Kistnasamy, 1975c: 35. Systematics. Compagno, 1984: 232, fig. No Philippine records, present in adjacent areas. Last & Stevens, 1994: 157, fig, pl. 12. No Philippine records. Compagno & Niem, 1998: 1273, fig. Western Central Pacific, no Philippine records. Compagno, 2001: 86, fig. 66. No Philippine records.

**Philippine material:** Photos, Pasil Fish Port, Cebu City, JPAG 117b, unknown sex, unknown TL, April 20, 1999.

**Remarks:** First record from the Philippines. Collected by WWF elasmobranch biodiversity project.

**Family Cetorhinidae Gill, 1862. Basking sharks.**

Subfamily Cetorhininae Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 397–398 (Family Lamnoidae). Type genus: Subgenus *Cetorhinus* Blainville, 1816 (Genus *Squalus* Linnaeus, 1758).

**Genus *Cetorhinus* Blainville, 1816. Basking sharks.**

Subgenus *Cetorhinus* Blainville, 1816, Bull. Sci. Soc. Philomat. Paris, (8): 121 (Genus *Squalus* Linnaeus, 1758). Type species designated as “*Cetorhinus gunneri* Blainv. = *S. maximus* L.” (a junior synonym of *Squalus maximus* Gunnerus, 1765) by Jordan & Gilbert (1883, Bull. U.S. Nat. Mus. 16: 31).

***Cetorhinus maximus* (Gunnerus, 1765). Basking shark.**

*Squalus maximus* Gunnerus, 1765, K. Norske Vidensk-selsk. Scr. Trondh.: 33, pl. 2. Holotype, apparently none; type locality: Trondhjem, Norway.

**References:** Bigelow & Schroeder, 1948: 147, figs. 23–24. Review of literature. Compagno, 1984: 234, fig. No Philippine records, present in adjacent areas. Last & Stevens, 1994: 159, fig, pl. 13. No Philippine records. Compagno & Niem, 1998: 1274, fig. Not known from the Western Central Pacific or Philippines. Compagno, 2001: 91, fig. 57. No Philippine records.

**Philippine material:** None.

**Remarks:** Fowler (1941) and Herre (1953) had no Philippine records of basking sharks. Not collected by the WWF elasmobranch biodiversity project. First record from Philippines. Burias Island, Masbate, December 1996, skeletal remains including vertebrae and claspers washed up on beach. The Philippines Star, March 9th, 1997. Identification: Victor G. Springer, *pers. comm.* Most basking shark records are from temperate coastal seas in both the Northern and Southern Hemispheres, but there are scattered oceanic and warm-temperate and tropical records including the Hawaiian Islands, Florida, Senegal, and KwaZulu-Natal, South Africa.

### Family Lamnidae Müller & Henle, 1838. Mackerel sharks.

Family Lamnoidea Müller & Henle, 1838a, Mag. Nat. Hist., new. ser., 2: 36.

#### Genus *Carcharodon* Smith, 1838. White sharks.

Genus *Carcharodon* Smith, in Müller & Henle, 1838a, Mag. Nat. Hist., n. ser., 2: 37. Placed on the Official List of Generic Names in Zoology (Name no. 1658) by the International Commission on Zoological Nomenclature (Opinion 723.3b, 1965, Bull. Zool. Nomencl. 22: 32). Type species, *Squalus carcharias* Linnaeus, 1758, by subsequent monotypy through *Carcharias lamia* Rafinesque, 1810 (International Commission on Zoological Nomenclature, 1965, *loc. cit.*).

#### *Carcharodon carcharias* (Linnaeus, 1758). White shark.

*Squalus carcharias* Linnaeus, 1758, Syst. Nat., ed. 10, 1: 235. Placed on the Official List of Specific Names in Zoology (Name no. 2056) by the International Commission on Zoological Nomenclature (Opinion 723.4b, 1965, Bull. Zool. Nomencl. 22: 32). Holotype unknown, type locality “Europa”.

**References:** *Carcharodon carcharias*: Herre, 1925: 114. Philippines. Roxas & Martin, 1937: 12. Philippines. Fowler, 1941: 110. Herre’s Philippine records. Bigelow & Schroeder, 1948: 134. General data, review of literature. Herre, 1953: 15. Camiguin Strait, off Misamis Oriental Province, Mindanao; Malampaya Sound, Palawan. Compagno, 1984: 238, fig. Summary of range, Philippines. Last & Stevens, 1994: 162, fig, pl. 14. Distribution, including Philippines. Compagno & Niem, 1998: 1276, fig. Philippines. Compagno, 2001: 100, fig. 71. Philippine records.

**Philippine material:** No material collected by the WWF elasmobranch biodiversity project.

**Remarks:** We know of no Philippine records of white sharks subsequent to those in Herre’s (1953) checklist but expect them, as the white shark is both widely and sporadically distributed in tropical seas.

#### Genus *Isurus* Rafinesque, 1810. Mako sharks.

Genus *Isurus* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 11. Type species, *Isurus oxyrinchus* Rafinesque, 1810, by monotypy.

**Remarks:** Fowler (1941) and Herre (1953) had no Philippine records of mako sharks.

#### *Isurus oxyrinchus* Rafinesque, 1810. Shortfin mako.

*Isurus oxyrinchus* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 12, pl. 13, fig. 1. Also Rafinesque, 1810, Indice Ittiol. Sicil.: 45. Holotype unknown, type locality Sicily, Mediterranean Sea.

**References:** *Isurus oxyrinchus*: Bigelow & Schroeder, 1948: 124. General data, review of literature. Garrick, 1967a: 674, fig. 6. Systematics and distribution, no Philippine specimens. Compagno, 1984: 242, fig. General range in area, no specific locality in Philippines. Moreno Garcia & Morón, 1992: 109–122. Comparative morphology, separation from *I. paucus*. Last & Stevens, 1994: 163, fig, pl. 14. Including Philippines. Compagno & Niem, 1998: 1277, fig. Distribution in Western Central Pacific, including Philippines. Compagno, 2001: 109, fig. 74. Philippine records.

**Philippine material:** 3 pairs dried jaws, Osucan, Plaridel; Off Eastern Palawan, SUML 002, unknown sex, unknown TL, PLJS 001, unknown sex, unknown TL, May 16, 2000; JPAG 172, unknown sex, unknown TL, April 6, 1999.

**Remarks:** Three sets of jaws (JPAG 0172, PLJS 001 and SUML 002) collected during WWF elasmobranch biodiversity project agree with descriptions in cited references. First record for the Philippines.

#### ?*Isurus paucus* Guitart Manday, 1966. Longfin mako.

*Isurus paucus* Guitart Manday, 1966, Poeyana, Ser. A, (15): 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 types known according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

*Isurus alatus* Garrick, 1967a, Proc. U.S. Nat. Mus., 118(3537): 677. Holotype: U.S. National Museum of Natural History, USNM-197427, 1233 mm TL immature male, Indo-Pacific, no precise locality. Status confirmed by Howe & Springer, 1993, Smithson. Contr. Zool. (540): 3.

**References:** *Isurus paucus*: Garrick, 1967a: 677, 684. Synonymy with *I. alatus*, no Philippine specimens. Compagno, 1984: 244, fig. General range, no specific locality in Philippines. Moreno Garcia & Morón, 1982: 109–122. Comparative morphology, separation from *I. paucus*. Compagno & Niem, 1998: 1278 fig. Western Central Pacific, no Philippine specimens. Compagno, 2001: 115, fig. 75. No Philippine records.

**Philippine material:** None.

**Remarks:** Distribution sketchy outside the North Atlantic but probably circumglobal in all warm seas. Caught off Taiwan and to be expected from the Philippines.

## **Order Orectolobiformes Compagno, 1973. Carpet sharks.**

Order Orectolobiformes Compagno, 1973c, J. Linn.Soc. (Zool.), 53, suppl. 1: 28.

## **Family Parascylliidae Gill, 1862. Collared carpetsharks.**

Subfamily Parascylliinae Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 407, 408, 412 (Family Scylliorhinoidea Gill, 1862).

### **Genus *Cirrhoscyllium* Smith & Radcliffe in Smith, 1913. Barbelthroat carpetsharks.**

Genus *Cirrhoscyllium* Smith & Radcliffe in Smith, 1913, Proc. U.S. Natn. Mus. 45(1917): 568. Type species: *Cirrhoscyllium exolitum* Smith & Radcliffe, 1913, by original designation.

### ***Cirrhoscyllium exolitum* Smith & Radcliffe in Smith, 1913. Barbelthroat carpetshark.**

*Cirrhoscyllium exolitum* Smith & Radcliffe in Smith, 1913, Proc. U.S. Natn. Mus. 45(1917): 568, fig. 1–2, pl. 45. Holotype: U.S. National Museum of Natural History, USNM-74603, 335 mm adult female, 21°33'N, 116°13'E, South China Sea between northern Luzon, Philippines, and China, 183 m. Status and correction in longitude from 118°E from Howe & Springer, 1993, Smiths. Contr. Zool. (540): 7.

**References:** *Chiloscyllium exolitum*: Roxas & Martin, 1937: 11. Philippines. *Cirrhoscyllium exolitum*: Fowler, 1941: 72. Holotype. Herre, 1953: 12. Holotype; Compagno, 1984: 168, fig. Philippines. Goto & Nakaya, 1996: 200, fig. 1. Systematics, distribution. Compagno & Niem, 1998: 1242, fig. Philippines. Compagno, 2001: 133, fig. 94. Philippines.

**Philippine material:** Holotype examined by L. Compagno.

**Remarks:** Not recorded by the WWF elasmobranch biodiversity project.

## **Family Orectolobidae Gill, 1896. Wobbegongs.**

Family Orectolobidae Gill, 1896, Proc. U.S. Natn. Mus. 18(1057): 212. Type genus: *Orectolobus* Bonaparte, 1834.

**Remarks:** Fowler (1941) had no records of wobbegongs from the Philippines.

### **Genus *Orectolobus* Bonaparte, 1834. Beardless wobbegongs.**

Subgenus *Orectolobus* Bonaparte, 1834 (Genus *Scyllium* Cuvier, 1816), Iconog. Fauna Italica, 3, Pesci, fasc. 7. Type species: *Squalus barbatus* Gmelin, in Linnaeus and Gmelin, 1788, by subsequent restriction of Gill, 1896, Proc. U.S. Natl. Mus. 18(1057): 211; a junior synonym of *Squalus maculatus* Bonnaterre, 1788.

### **?*Orectolobus japonicus* Regan, 1906. Japanese wobbegong.**

*Orectolobus japonicus* Regan, 1906, Ann. Mag. Nat. Hist. (7), 18(108): 435. Syntypes: British Museum (Natural History), BMNH 1862.11.1.18 and BMNH 1862.11.1, two females, 1000 and 780 mm TL, Japan.

**References:** *Orectolobus japonicus*: Herre, 1953: 12, reference to Martin's (1938, Philippine J. Sci. 66: 388, pl. 1, not seen) record with illustration from off Siquijor Island. Compagno, 2001: 154, fig. 121. No Philippine records.

**Philippine material:** None.

**Remarks:** Possibly confused with the following species and its presence in the region needs confirmation.

***Orectolobus cf. ornatus*. Philippine wobbegong.**

**Philippine material:** 1 without internal organs, Pasil Fish Market, Cebu City, JPAG 129, unknown sex, 882 mm TL, April 20, 1999.

**Remarks:** The taxonomy of *Orectolobus* in the Indo–West Pacific is confused as several forms have been identified incorrectly as the Australian *O. ornatus* (de Vis, 1883) or *O. maculatus* (Bonnaterre, 1788). The Philippine species is distinct from nominal species occurring in Australia and Japan but is closely related to a form known from Indonesia (P. Last).

**Family Hemiscylliidae Gill, 1862. Longtailed Carpetsharks.**

Subfamily Hemiscylliinae Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 407, 408 (Family Scylliorhinoidea Gill, 1862). Type genus: *Hemiscyllium* Müller & Henle, in Smith, 1837.

**Genus *Chiloscyllium* Müller & Henle, 1837. Bamboo sharks.**

Genus *Chiloscyllium* Müller and Henle, 1837a, Ber. K. preuss. Akad. wiss. Berlin, 2: 112; Müller and Henle, 1837b, Arch. Naturg. 3: 395 (no species mentioned); Müller and Henle, in Smith, 1837, Proc. Zool. Soc. London, 5: 85 (one species, *Scyllium plagiosum* Bennett, 1830); Müller and Henle, 1838a, Mag. Nat. Hist., new ser. 2: 34; Müller and Henle, 1838b, L’Institut, 6: 64; Müller and Henle, 1838c, Arch. Naturg. 4: 83 (no species mentioned); Müller and Henle, 1838d, Syst. Besch. Plagiost., pt. 1: 17 (five species, no type allocation). Type species: *Scyllium plagiosum* Bennett, 1830, by subsequent monotypy of Müller and Henle, in Smith, 1837, Proc. Zool. Soc. London, pt. 5: 85; also by subsequent designation of Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 408, as “*Chiloscyllium plagiosum* Müll. and Henle”.

**?*Chiloscyllium griseum* Müller & Henle, 1838. Grey bamboo shark.**

*Chiloscyllium griseum* Müller & Henle, 1838d, Syst. Besch. Plagiost., pt. 1: 19. Syntypes: “Ein Exemplar aus Malabar durch Dussumier; 6 Exemplare von Pondichery durch Belanger, in Weingeist, in Paris. Indien, Japan”. Lectotype: Museum National d’Histoire Naturelle, Paris, MNHN–1010, 374 mm immature male, Malabar, Kerala, India, designated by Dingerkus & DeFino, 1983, Bull. American Mus. Nat. Hist. 176(1): 12.

**References:** *Hemiscyllium griseum*: Fowler, 1941: 88. Summary of nominal records from Philippines. *Chiloscyllium griseum*: Herre, 1953: 11. Summary of nominal records from Philippines, listed from Sim Sim Laut Island, Sulu Sea, near entrance to Sandakan Bay. Dingerkus & DeFino, 1983: 12, figs. 8–9, 12, 24, 65–66. Specimens from Indian subcontinent, no Philippine records. Compagno & Niem, 1998: 1253, fig. Philippines, but uncertain records. Compagno, 2001: 169, fig. 138. Nominal from Philippines.

**Philippine material:** None.

**Remarks:** Dingerkus & DeFino (1983) revised the Hemiscylliidae and did not record specimens of this species from the Philippines; status uncertain in the Philippines, possibly confused with either *C. punctatum* or *C. hasselti*.

**?*Chiloscyllium indicum* (Gmelin, 1788). Slender bamboo shark.**

*Squalus indicus* Gmelin, in Linnaeus & Gmelin, 1788, Syst. Nat., ed. 13, Pisces 1(3): 1503. Holotype: British Museum (Natural History), BMNH–1853.11.12.205, 274 mm TL female, “Oceano Indico”, Gronow collection. Eastern Indian Ocean.

**References:** *Hemiscyllium colax*: Fowler, 1941: 89. Cavite, after Casto de Elera, no specimens. *Chiloscyllium indicum*: Gogorza y Gonzales, 1888: 393. Filipinas. Palacky, 1891: 230. Philippines. Casto de Elera, 1895: 617. Cavite, Santa Cruz, Luzon. Roxas & Martin, 1937: 11. Philippines. Herre, 1953: 9. Listed for Philippines but without new material or records, citation of Fowler’s (1918, Copeia, [58]: 62) record from Philippines. Dingerkus & DeFino, 1983: 21, figs. 13–15, 24, 53, 71–74. Specimens from southern South China Sea, but not Philippines. Compagno, 1984: 193, fig., Philippines. Compagno & Niem, 1998: 1255, fig. Philippines. Compagno, 2001: 172, fig. 140. Questionable from Philippines.

**Philippine material:** None.



**Remarks:** Dingerkus & DeFino (1983) revised the Hemiscylliidae and did not record this species from Philippines; status uncertain in the Philippines.

***Chiloscyllium plagiosum* (Bennett, 1830). Whitespotted bamboo shark.**

*Scyllium plagiosum* Bennett, 1830, *In* S. Raffles, Mem. Life Pub. Serv. Sir Thomas Stamford Raffles, London, Fishes: 694. Holotype: British Museum (Natural History), probably lost, Sumatra. Neotype: California Academy of Sciences, CAS-36046, 503 mm TL adult male, 5°58'S, 106°48'E, Java Sea, Indonesia, designated by Dingerkus & DeFino, 1983, Bull. American Mus. Nat. Hist. 176(1): 24.

**References:** *Hemiscyllium plagiosum*: Fowler, 1941: 86. Philippines. *Chiloscyllium plagiosum*: Roxas & Martin, 1937: 11. Philippines. Herre, 1953: 10. Manila Bay; Calapan, Mindoro. Compagno, 1984: 194, fig., Philippines. Dingerkus & DeFino, 1983: 22, figs. 16, 24, 54, 75–78. Specimens from Philippines including U.S. National Museum of Natural History, USNM-221165, Visayan Sea between N. Negros and Masabate Islands; Academy of Natural Sciences, Philadelphia, ANSP 49287, Philippines; USNM-196046, off Cape Calavite, Mindoro; Bishop Museum, Hawaii, BPBM 26484, Cebu City, Cebu; BMNH 1879.5.14.450, Manila; Zoologisches Museum der Universität, Hamburg, ZMH-10122, Manila. Compagno & Niem, 1998: 1256, fig. Western Central Pacific, including Philippines. Compagno, 2001: 174, fig. 141. Philippines.

**Philippine material:** Specimen examined by L. Compagno in Marine Science Institute, University of Philippines, Manila, from Cebu market, Lapu-Lapu, Pasil & Carbon, Olongo Is., 25–27 September, 1995, adult male, 689 mm TL, 510 mm PCL. 13 whole, Malabuhan and Maitom, Siaton; Salag Daku, Buenavista, Guimaras; Pasil Fish Market, Cebu City; Palapala Fish Port, Bacolod City, BRU 014, female, 315 mm TL, January 30, 1999; BRU 037, female, 665 mm TL, February 16, 1999; JPAG 029, immature male, 534 mm TL, February 14, 1999; JPAG 134, female, 688 mm TL, April 22, 1999; JPAG 158, mature male, 718 mm TL, April 21, 1999; JPAG 160, female, 749 mm TL, April 21, 1999; JPAG 164, immature male, 386 mm TL, April 22, 1999; JPAG 032, female, 461 mm TL, February 14, 1999; JPAG 048, female, 534 mm TL, March 21, 1999; JPAG 031, mature male, 574 mm TL, February 14, 1999; JPAG 047A, immature male, 556 mm TL, March 21, 1999; BRU 036, female, 683 mm TL, February 16, 1999; JPAG 030, immature male, 479 mm TL, February 14, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 0158, adult male, in the WWF photo catalogue agrees with the descriptions in cited references. It is not as densely spotted as illustrations in Compagno (1984) and Compagno & Niem (1998).

***Chiloscyllium punctatum* Müller & Henle, 1838. Brownbanded bamboo shark.**

*Chiloscyllium punctatum* Müller & Henle, 1838d, Syst. Besch. Plagiost., pt. 1: 18, pl. 3, 4 (pl. 4 labeled as *C. griseum*). Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, probably lost, Java. Neotype: American Museum of Natural History, AMNH-38153, 352 mm TL female, Batavia (Jakarta), Java, Indonesia, designated by Dingerkus & DeFino, 1983, Bull. American Mus. Nat. Hist. 176(1): 30.

**References:** *Hemiscyllium punctatum*: Fowler, 1941: 86. Philippines. *Chiloscyllium punctatum*: Roxas & Martin, 1937: 11. Philippines. Herre, 1953: 10. Dumaguete, Oriental Negros; and Cebu. Dingerkus & DeFino, 1983: 30, figs. 18–24, 39, 41, 43, 45–46, 49, 55, 79–80. Specimens include AMNH-44030 and 44022, Lapu Lapu City, Cebu Island; U.S. National Museum of Natural History, USNM-170496, Zamboanga; USNM-170497, Cebu Island; Museum of Comparative Zoology, Harvard, MCZ-33405, Lubang, Mindoro Island; MCZ-475-S, Philippines; Field Museum of Natural History, FMNH-50966, Puerto Princessa, Palawan; Bishop Museum, Hawaii, BPBM-22097, BPBM-26466, Cebu City, Cebu Island; Stanford University, SU-13660, Philippines, collected by A.W.C.T. Herre. Compagno, 1984: 194, fig. Philippines. Last & Stevens, 1994: 135, fig. pl. 17. Including Philippines. Compagno & Niem, 1998: 1257, fig. Western Central Pacific, including Philippines. Compagno, 2001: 175, fig. 142. No Philippine records.

**Philippine material:** Specimen examined by L. Compagno in Marine Science Institute, University of Philippines, Manila, from Cebu market, Lapu-Lapu, Pasil & Carbon, Olongo Is., 25–27 September, 1995, immature male, 531 mm TL, 390 mm PCL. Six whole specimens, Pasil Fish Port and Market I, Cebu City; Malabuhan, Siaton; Iloilo City Fish Port; Silliman Beach, Dumaguete City, JPAG 159, immature male, 590 mm TL, April 23, 1999; JPAG 163, immature male, 342 mm TL, collected between February and April, 1999; BRU 013, female, 443 mm TL, January 30, 1999; BRU 025, mature male, 860 mm TL, February 11, 1999; MMLM 015, female, 775 mm TL, June 15, 1999; BRU 024, mature male, 891 mm TL, February 11, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 0134, female, and JPAG 163, immature male, in WWF photo catalogue agree with descriptions in cited references.

### Family Stegostomatidae Gill, 1862. Zebra sharks.

Subfamily Stegostomatinae Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 407, 408 (Family Scylliorhinoidea Gill, 1862). Type genus: *Stegostoma* Müller & Henle, 1837.

#### Genus *Stegostoma* Müller & Henle, 1837. Zebra sharks.

Genus *Stegostoma* Müller & Henle, 1837a, Ber. K. preuss. Akad. wiss. Berlin, 2: 112. Type species: *Squalus fasciatus* Bloch & Schneider, 1801, by original designation, equals *Squalus fasciatus* Hermann, 1783.

#### *Stegostoma fasciatum* (Hermann, 1783). Zebra shark.

*Squalus fasciatus* Hermann, 1783, Tab. Affin.: 302. Based on *Squalus varius* Seba, 1759. No type specimens. No types for either species according to Eschmeyer (Catalog of Fishes, CD-ROM).

**References:** *Stegostoma varium*: Roxas & Martin, 1937: 12. Philippine references from Herre. Herre, 1953: 13. Manila Bay; a river at San Jose del Monte, Bulacan Prov; coast of Batangas Province, Luzon; and Dumaguete, Oriental Negros. *Stegostoma fasciatum*: Fowler, 1941: 100, fig. 7. Philippines, Academy of Natural Sciences, Philadelphia, ANSP, 356 mm specimen. Compagno, 1984: 200, fig., Philippines. Last & Stevens, 1994: 138, fig. pl. 13. Including Philippines. Compagno & Niem, 1998: 1262, fig. Western Central Pacific, including Philippines. Compagno, 2001: 186, fig. 156. Philippines. *Stegostoma tigrinum*: Gogorza y Gonzales, 1885: 74. I. de la Paragua. Gogorza y Gonzales, 1888: 393. Puerto-Princesa (Paragua). Casto de Elera, 1895: 613–621 (as *S. tigrinum*). Philippines. Roxas & Martin, 1937: 12. Philippines, from Fowler, considered separate from *S. varium*.

**Philippine material:** Photos, Malabon Market, Manila; Tagburos, Puerto Princesa City; Roxas City, JPAG 359, unknown sex, unknown TL, October 19, 2000; JPAG 199, unknown sex, unknown TL, July 1, 1999; JPAG 203, unknown sex, unknown TL, July 7, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 199, JPAG 203, and JPAG 359 in WWF photo catalogue agree with descriptions in cited references. See Compagno (2001) for a discussion of the use of *Squalus varius* Seba, 1758, as the name of this species.

### Family Ginglymostomatidae Gill, 1862. Nurse sharks.

Family Ginglymostomatoidae Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 393, 395, 397, 406. Type genus: *Ginglymostoma* Müller & Henle, 1837.

#### Genus *Nebrius* Rüppell, 1837. Tawny nurse sharks.

Genus *Nebrius* Rüppell, 1837, Neue Wirbel. Fauna Abyssinien gehör., Fische Rothen Meeres (1835–1838): 62. Type species: *Nebrius concolor* Rüppell, 1837, by monotypy.

#### *Nebrius ferrugineus* (Lesson, 1830). Tawny nurse shark.

*Scyllium ferrugineum* Lesson, 1830, Voy. aut. monde corv. *La Coquille* 2(1): 95. Holotype: Specimen with body 3' 4" (102 cm) and tail 14" (36 cm) mentioned, possibly not saved. Type locality, Port Praslin, New Ireland, and Baie d'Offack, Waigiou (Waigeu), New Guinea.

**References:** *Nebrius ferrugineus*, *N. concolor*, *N. macrurus*: Fowler, 1941: 69–71. Indo–West Pacific, no Philippine records. *Nebrius ferrugineus*: Compagno, 1984: 207, figs. No Philippine records. Last & Stevens, 1994: 140, fig. pl. 17. Distribution, no Philippine records. Compagno & Niem, 1998: 1260–1261, fig. Western Central Pacific, including Philippines. Compagno, 2001: 196, fig. 161. Philippines, Luzon.

**Philippine material:** Specimen examined and collected by L. Compagno from Navotas Market, Manila, 5 Oct. 1995, 785 mm TL, 515 mm PCL immature (newborn) female, held at South African Museum.

**Remarks:** Above specimen mapped as the first record from the Philippines (Compagno & Niem, 1998).

### Family Rhincodontidae Müller & Henle, 1839. Whale sharks.

Family Rhinodontes Müller & Henle, 1839, Syst. Besch. Plagiost., pt. 2: 77. As the emended Family Rhincodontidae, type genus *Rhincodon* Smith, 1829.

**Genus *Rhincodon* Smith, 1829. Whale sharks.**

Genus *Rhincodon* Smith, 1829, Zool. J. 4: 443. Type species: *Rhiniodon typus* Smith, 1828, as interpreted by the International Commission on Zoological Nomenclature, 1984, Opinion 1278, Bull. Zool. Nomen. 41(4): 215.

***Rhincodon typus* (Smith, 1828). Whale shark.**

*Rhiniodon typus* Smith, 1828, S. African Comm. Advertiser, 3(145): 2. Holotype: Museum National d'Histoire Naturelle, Paris, MNHN 9855, 4600 mm stuffed, mounted male specimen, Table Bay, South Africa.

**References:** *Rinodon typicus*: Casto de Elera, 1895: 615. Manila, Luzon. *Rhineodon typus*: Roxas & Martin, 1937: 12. Philippines. Herre, 1953: 14. Summary of Philippine distribution, from Mariveles Bay; Sulu Islands and Cebu; Bacolod, Occidental Negros; Luzon, Manila Bay, Navotas, Rizal Province; Mariveles Bay, Samar; Barrio Garat, Libagon, on the east, and Barrio San Vicente, Malitbog, on the west side of Sogod Bay, and Maasin on the southwest coast of Leyte; Cebu and Argau, Cebu; Silay, Occidental Negros; Iloilo market, Panay; San Jose, Antique Province; Panay; Iligan Bay, Lanao Province; off Tagolo Pt., Dapitan Bay, and Zamboanga market, Zamboanga Province, Mindanao; Tapiantana Islands and Jolo market, Sulu Province; near Darvel Bay off Sibutu Island, Sulu Province, near boundary between Philippines and Borneo; Balabac Strait, Palawan. *Rhiniodon typus*: Compagno, 1984: 210, fig. General distribution, Philippines. *Rhincodon typus*: Fowler, 1941: 116. Philippines. Bigelow & Schroeder, 1948: 189, fig. 30. General data, review of literature. Uchida, 1984: 177, fig. 1–12. Distribution, Philippines. Wolfson, 1986: 208, figs. 1–4. General distribution, Philippines. Last & Stevens, 1994: 142, fig. pl. 15. Distribution, including Philippines. Compagno & Niem, 1998: 1263, fig. Western Central Pacific, including Philippines. Compagno, 2001: 203, fig. 163. Philippines, Luzon.

**Philippine material:** 1 pair dried jaws, Pamilacan Island, SUML 006, unknown sex, unknown TL, May 15, 1997.

**Remarks:** A set of jaws (SUML 006) collected during WWF elasmobranch biodiversity project agrees with the description of *Rhincodon typus* in cited references. Diver observations are common and the species is part of an ecotourism project in Palawan and southern Luzon.

**Order Carcharhiniformes Garman, 1913. Ground sharks.**

Order Plagiostoma, Suborder Antacea, "Group" Carcharinoidei Garman, 1913, Mem. Mus. Comp. Zool. Harvard 36: 11, 12.

**Family Scylliorhinidae Gill, 1862. Catsharks.**

Family Scylliorhinoidae Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 393, 396, 406, 412. Type genus: "*Scylliorhinus* Blainville, 1816", unjustified emendation of *Scylliorhinus* Blainville, 1816 by Gill, *ibid.*: 407.

**Genus *Apristurus* Garman, 1913. Demon catsharks.**

Genus *Apristurus* Garman, 1913, Mem. Harvard Mus. Comp. Zool., 36: 96. Type species: *Scylliorhinus indicus* Brauer, 1906, by original designation.

***Apristurus herklotsi* (Fowler, 1934). Longfin catshark.**

*Pentanchus herklotsi* Fowler, 1934, Proc. Acad. Nat. Sci. Philadelphia, 85: 238, fig. 3. Holotype: U.S. National Museum of Natural History, USNM 93134, 312 (326) mm TL immature female, *Albatross* Sta. D.5424, 9° 37'05"N, 121° 12'37"E, Cagayan island, Jolo Sea, Philippine Islands. Status of holotype confirmed by Howe & Springer (1993, Smiths. Contr. Zool. [540]: 7).

**References:** *Pentanchus herklotsi*: Roxas & Martin, 1937: 12. Philippines. Fowler, 1941: 54, fig. 4. *Apristurus herklotsi*: Herre, 1953: 8. USNM holotype from near Cayagan Sulu Island. Springer, 1979: 18. Holotype examined. Compagno, 1984: 264, fig. Holotype examined, Philippines. Compagno, 1988: 174. Holotype, Philippines. Nakaya, 1988, 133, figs. 1–12. Philippines, systematics. Nakaya, 1991: 992–1002, figs. 1–10. Philippines, systematics. Compagno & Niem, 1998: 1286. Western Central Pacific, including Philippines.

**Philippine material:** Holotype, USNM 93134, no additional material examined. A search on the USNM fish database (USNM URL, 2002) indicated two additional Philippine specimens identified as *Apristurus herklotsi*, USNM-168185, 10°33'30"N, 122°26'00"E, Lausatan Pt. Light between Panay & Guimaras, 251 m, and USNM-168186, 13°48'30"N, 120°28'40"E, Malavatuan Island, Luzon, both collected by RV *Albatross*. Nakaya (1988, 1991) provided additional records of this species from the South and East China Seas and from Japan (Tosa Bay, Shikoku).

**Remarks:** Nakaya (1991) synonymized several recently described species of long-nosed *Apristurus* from the continental slope off China with *A. herklotsi*: *A. abbreviatus* Deng, Xiong & Zhan, 1985 from the East China Sea; and *A. xenolepis* Meng, Zhu & Li, 1985; *A. brevicaudatus* Zhu, Meng & Li, 1986, *A. longianalis* Zhu, Meng & Li, 1986, and *A. longicaudatus* Li, Meng & Zhu, 1986 from the South China Sea. For details of this synonymy see Nakaya (1991).

### **Genus *Atelomycterus* Garman, 1913. Coral catsharks.**

Genus *Atelomycterus* Garman, 1913, Mem. Harvard Mus. Comp. Zool., 36: 100. Type species: *Atelomycterus marmoratus* Garman, 1913 (new combination), by monotypy, equals *Scyllium marmoratum* Bennett, 1830.

#### ***Atelomycterus marmoratus* (Bennett, 1830). Coral catshark.**

*Scyllium marmoratum* Bennett, 1830, In S. Raffles, Mem. Life Pub. Serv. Sir Thomas Stamford Raffles, London, Fishes: 693. Holotype: British Museum (Natural History), a skin of a juvenile, possibly lost, according to Springer, 1979 (Nat. Ocean. Atmosp. Admin. Tech. Rept., Nat. Mar. Fish. Serv. Circ. [422]: 35), Sumatra.

**References:** *Scyllium marmoratum*: Casto de Elera, 1895: 616. Manila, Luzon. *Scyllium maculatum*: Casto de Elera, 1895: 616. Cavite, Luzon. *Atelomycterus marmoratus*: Roxas & Martin, 1937: 11. Philippines, summary of records from Herre. Fowler, 1941: 62, fig. 6. Colour morphs from Philippines and Sulawesi. Herre, 1953: 8. Records from Dicuayan Island, Busuanga; Dumaguete, Oriental Negros Province; Linapacan Is., Palawan; Siasi, Sitankai, and Jolo, Sulu Province Springer, 1979: 33–36, fig. 9. Variability in colour pattern, possibly more than one species. Compagno, 1984: 293, fig. Distribution, Philippines. Compagno, 1988: 103, pl. 1b. Distribution, Philippine specimens. Compagno & Stevens, 1993a: 147–169, fig. 13. Philippine specimens. Compagno & Niem, 1998: 1268, fig. Western Central Pacific, including Philippines.

**Philippine material:** Specimens including SU-13562, 615 mm TL adult male, Linapucan Island; SU-13563, 570 mm TL adult female, Sitankai, Sibutu Island; SU-13659, 477 mm TL adult male, Dumaguete, Negros Island; SU-13689, 472 mm TL immature female, Siasi Island; Los Angeles County Museum of Natural History, LACM-37431-1, 428 mm TL immature female, Pangasinan, near Bolinao. Specimen from Bolinao Market, caught near Bolinao in less than 40 m, afternoon market, October 7, 1995, adult male, 644 mm TL, 518 mm PCL. 6 whole, Palapala Fish Port, Bacolod City; Silliman Beach, Dumaguete City; Pasil Fish Market I, Cebu City, JPAG 046, female, 551 mm TL, March 21, 1999; MMLM 005, mature male, 556 mm TL, March 1, 1999; JPAG 044, male, 585 mm TL, March 21, 1999; JPAG 353, mature male, 522 mm TL, April 13, 2000; JPAG 354, female, 586 mm TL, April 13, 2000; JPAG 355, mature male, 479 mm TL, April 13, 2000; JPAG 356, female, 458 mm TL, April 13, 2000; JPAG 046A, male; (black spotted morph) 1 whole, Pasil Fish Port, Cebu City, JPAG 323, female, 566 mm TL, April 12, 2000.

**Remarks:** Observed often during WWF elasmobranch biodiversity project. JPAG 046 adult male, in photo catalogue generally agrees with description in literature cited above but a white spot on tip of upper caudal is not shown in the illustration by Compagno, 1984. Additional material from Indonesia, suggests that this species varies significantly in the density of white spots and the degree at which these spots are defined. Spots vary in size and their margins can vary from moderately well defined to diffuse. However, given that specimens collected from Cebu can be distinguished visually from those collected in Negros, it is likely that discreet populations exist. A single specimen (JPAG 323) from Cebu possesses white tips bordered by a medial black bar on the dorsal fins that typifies this species. However it is primarily paler, somewhat brownish with distinct brownish black spots and lacks the white spots and darker reticulations typical of *A. marmoratus*. A characteristic whitish stripe extending from beneath the eyes through the middle of the gill slits remains evident. The second dorsal-fin origin is distinctly more posterior to the anal-fin origin than in most of the material.

### **Genus *Cephaloscyllium* Gill, 1862. Swellsharks.**

Genus *Cephaloscyllium* Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 408, 412. Type species: *Scyllium laticeps* Dumeril, 1853, by original designation.

***Cephaloscyllium*, sp. 1. Philippine swellshark.**

**Philippine material:** 12 whole, Dipolog City Public Market; Liberty, Bagong Sikat, Puerto Princesa City; Pasil Fish Port I, Cebu City; Bukana, Sikayab, Dapitan City; Siquijor Island, JPAG 056, female, 649 mm TL, April 8, 1999; JPAG 057, female, 608 mm TL, April 8, 1999; JPAG 231, female, 663 mm TL, March 16, 2000; JPAG 232, female, 711 mm TL, March 16, 2000; JPAG 236, female, 477 mm TL, March 16, 2000; JPAG 238, female, 756 mm TL, March 16, 2000; JPAG 331, mature male, 482 mm TL, April 13, 2000; JPAG 332, mature male, 515 mm TL, April 13, 2000; JPAG 334, mature male, 499 mm TL, April 13, 2000; JPAG 273a, female, 651 mm TL, March 29, 2000; RSE 009, mature male, 576 mm TL, June 16, 1999; JPAG 239, female, 529 mm TL, March 16, 2000.

**Remarks:** This undescribed species was discovered during the WWF elasmobranch biodiversity project. However, it is uncertain if Herre's (1953) records of *Scyliorhinus torazame* from Dumaguete are based on a misidentification of this species (see *Scyliorhinus* below).

**Genus *Galeus* Rafinesque, 1810. Sawtail catsharks.**

Genus *Galeus* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 13. Type species: *Galeus melastomus* Rafinesque, 1810, by subsequent designation of Fowler, 1908, Proc. Acad. Nat. Sci. Philadelphia, 60: 53.

***Galeus sauteri* (Jordan & Richardson, 1909). Taiwan sawtail catshark.**

*Pristiurus sauteri* Jordan & Richardson, 1909, Mem. Carnegie Mus. 4(4): 160, pl. 63, fig. 1. Syntypes: Stanford University, SU-21261, four adult males, 364, 367, 367, 370 mm TL, from Takao, Taiwan, of six mentioned by Jordan & Richardson.

**References:** *Galeus sauteri*: Fowler, 1941: 28. Taiwan, no Philippine records. Springer, 1979: 66–67. CAS Philippine specimens from L.J.V. Compagno (*pers. comm.*). Compagno, 1984: 317, fig. Distribution, possibly Philippines. Compagno, 1988: 142. Philippine specimens. Compagno & Stevens, 1993b: 173. Philippine specimens. Compagno & Niem, 1998: 1290, fig. Western Central Pacific, including Philippines.

**Philippine material:** CAS-34132, two females, 301–303 mm TL, Batangas Province, Batangas Bay, E. of Talaga, Philippines. 26 whole, 1 with damaged caudal fin, Bukana, Sikayab, Dapitan City; Dipolog City Public Market; Malabuhan, Siaton; Punta Miray, Baliangao; Pasil, Polo, Dapitan City; Yardahan, Basay, JPAG 100, female, 358 mm TL, April 17, 1999; JPAG 102, immature male, 256 mm TL, April 17, 1999; JPAG 076, female, 330 mm TL, April 17, 1999; JPAG 077, mature male, 320 mm TL, April 17, 1999; JPAG 096, female, 344 mm TL, April 17, 1999; JPAG 101, female, 298 mm TL, April 17, 1999; JPAG 103, female, 359 mm TL, April 17, 1999; JPAG 104, female, 353 mm TL, April 17, 1999; JPAG 105, mature male, 258 mm TL, April 17, 1999; JPAG 109, mature male, 304 mm TL, April 17, 1999; JPAG 107, female, 277 mm TL, April 17, 1999; JPAG 245, mature male, 311 mm TL, March 26, 2000; BRU 016, mature male, 322 mm TL, February 1, 1999; BRU 017, mature male, 287 mm TL, February 1, 1999; BRU 018, mature male, 294 mm TL, February 1, 1999; JPAG 246, mature male, 287 mm TL, March 25, 2000; JPAG 247, mature male, 313 mm TL, March 25, 2000; BRU 050, mature male, 289 mm TL, April 9, 1999; BRU 051, immature male, 278 mm TL, April 9, 1999; BRU 069, female, 245 mm TL, April 10, 1999; BRU 134, female, 278 mm TL, March 25, 2000; BRU 132, female, 358 mm TL, March 25, 2000; BRU 133, female, 334 mm TL, March 25, 2000; BRU 135, female, 350 mm TL, March 25, 2000; BRU 002, mature male, 313 mm TL, January 20, 1999; BRU 003, female, 369 mm TL, January 20, 1999; JPAG 006, female, 351 mm TL, January 20, 1999.

**Remarks:** Herre (1953) didn't mention this species in his checklist. Extensive comparative material of *Galeus sauteri* was examined from Japan and Taiwan, including the syntypes, and confirmed the identity of Philippine material of this shark. Previously Compagno (1988) and Compagno & Stevens (1993b) had listed a few specimens of Philippine *Galeus sauteri* as being questionably assigned to the species.

***Galeus schultzi* Springer, 1979. Dwarf sawtail catshark.**

*Galeus schultzi* Springer, 1979, Nat. Ocean. Atmosp. Admin. Tech. Rept., Nat. Mar. Fish. Serv. Circ. (422): 67. Holotype: U.S. National Museum of Natural History, USNM-122312, 297 mm adult female, *Albatross* Sta. 4693, Balayan Bay, Luzon, Philippines, 329 m. Status of holotype confirmed by Howe & Springer (1993, Smiths. Contr. Zool. [540]: 13).

**References:** *Galeus schultzi*: Compagno, 1984: 318, fig. Philippines. Compagno, 1988: 142. Philippine specimens. Compagno & Stevens, 1993b: 173. Philippine specimens. Compagno & Niem, 1998: 1290, fig. Western Central Pacific, including Philippines.

**Philippine material:** Luzon, Batangas Province, Balayan Bay: CAS–33783, 177 mm TL female, S. of Cape Santiago; CAS–34556, two immature males, 165–182 mm TL, SE of Pagapas Bay; CAS–34852, 143 mm TL immature female and 155 mm TL immature male, SE of Pagapas Bay; CAS–34861, 147 mm TL immature male, S. of Cape Santiago. Specimen in Marine Science Institute, University of Philippines from MUSOSTROM survey, MUSOSTROM II, Philippines, St. 84, 50 m, 12/2/80, no locality data, 193 mm PCL, adult male, caudal fin damaged with posterior two-thirds of the fin missing.

**Remarks:** Apparently endemic to the Philippines.

#### ***Galeus* sp. 1. Philippine sawtail catshark.**

**References:** ?*Galeus nipponensis*: Zhu & Meng, 2001: 173, fig. 86. China, 450 mm adult male illustrated.

**Philippine material:** 3 whole, Bukana, Sikayab and Pasil, Polo, Dapitan City, JPAG 098, female, 430 mm TL, April 14, 1999; BRU 130, mature male, 467 mm TL, March 25, 2000; JPAG 271, female, 430 mm TL, April 17, 1999.

**Remarks:** This species is closely related to the Japanese *Galeus nipponensis* Nakaya, 1979. The two species are similar in overall morphology and have an unusually, short-based anal fin, a long pelvic–anal space, a long snout, a broad apron formed from the free rear tips of the pelvics and covering the clasper bases in males, and long slender claspers in males. The Philippine species was compared with Nakaya’s (1979) description and with numerous specimens of *G. nipponensis* (including the holotype and paratypes) from the Hokkaido University fish collection, as well as an additional specimen from the Tokyo National Science Museum. Although close to the Philippine shark, *G. nipponensis* differs in having a greater size at maturity, more elongated preanial snout, smaller eyes, more distinct blotches on the head, trunk and tail (essentially obsolete in the Philippine species), and quadrangular (rather than lobate) anterior nasal flaps. Zhu & Meng (2001) illustrated a 450 mm TL adult male, ‘nipponensis-like’ catshark from China that may be the same as the Philippine species.

#### **Genus *Halaelurus* Gill, 1862. Tiger catsharks**

Genus *Halaelurus* Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 407, 412. Type species: “*Halaelurus burgeri* Gill”, by original designation, equals *Scyllium buergeri* Müller & Henle, 1838.

#### **?*Halaelurus* cf. *boesemani* Springer & D’Aubrey, 1972. Speckled catshark.**

*Halaelurus boesemani* Springer & D’Aubrey, 1972, S. African Ass. Mar. Bio. Res, Oceanogr. Res. Inst., Invest. Rept. (29): 11, fig. 1D, 2, 3A. Holotype: U.S. National Museum of Natural History, USNM–205136, 430 mm TL adult male, 11°37’N, 51°27’E, off Somalia, RV *Anton Bruun* IIOE Cruise 9, Sta. 465, 67–72 m Distribution from Somalia, Gulf of Aden, Amboina, Western Australia, and “probably the Gulf of Tonkin and Philippines” (*ibid.*, p. 14).

**References:** *Halaelurus boesemani*: Springer, 1979: 70–72, fig. 36–37. Distribution, Somalia, Gulf of Aden, Amboina, Western Australia. Compagno, 1984: 322. Philippines, after Springer & D’Aubrey, 1972. Last & Stevens, 1994: 203, fig. pl. 18. Distribution, including Philippines. Compagno & Niem, 1998: 1291, fig. Western Central Pacific, including Philippines.

**Philippine material:** None seen.

**Remarks:** *Halaelurus boesemani* was not collected during the WWF project and its record from the region may be due to confusion with *H. cf. buergeri*. The extensive Indo–West Pacific range ascribed to *H. boesemani* by Springer & D’Aubrey (1972) and Springer (1979), needs confirmation, as other members of the genus have more localized distributions. Independent investigations of these forms by Compagno, Last and White suggest that several species are involved.

#### ***Halaelurus* cf. *buergeri* (Müller & Henle, 1838). Blackspotted catshark.**

*Scyllium buergeri* Müller & Henle, 1838d, Syst. Besch. Plagiost., pt. 1: 8, pl. 2. Lectotype: Rijksmuseum van Natuurlijke Historie, Leiden, RNH–D2593, designated by Boeseman, 1947, Zool. Mededl. (Leiden), 28: 215.

**References:** *Scyllium burgeri*: Casto de Elera, 1895: 616. Currimao, Luzon, Ilocos. *Halaelurus buergeri*: Fowler, 1941: 44. Citation of Casto de Elera’s record, no specimens. Herre, 1953: 11. South China Sea between

Hainan and Luzon. Springer & D'Aubrey, 1972: 10, fig. 1c, Japan, Taiwan, China (Hong Kong). Springer, 1979: 72–74, fig. 38–39. Japan, Hong Kong. Compagno, 1984: 322, fig. Distribution, no Philippine records but present in adjacent areas. Compagno & Niem, 1998: 1284, fig. 34. Uncertain in Western Central Pacific, no Philippine records.

**Philippine material:** 10 whole, Candumaw, Pagatban, Basay; Malabuhan, Siaton; Bukana, Sikayab and Isla Verde, Pulu, Dapitan City; Caticugan, Siquijor, JPAG 005, female, 453 mm TL, January 19, 1999; BRU 006, female, 416 mm TL, January 25, 1999; BRU 007, female, 433 mm TL, January 25, 1999; JPAG 008, female, 480 mm TL, January 22, 1999; JPAG 114, female, 507 mm TL, April 17, 1999; JPAG 115, female, 533 mm TL, April 17, 1999; JPAG 144, female, 358 mm TL, April 9, 1999; JPAG 145, female, 418 mm TL, April 10, 1999; RSE 003, female, 456 mm TL, March 28, 1999; RSE 004, mature male, 497 mm TL, March 28, 1999.

**Remarks:** *Halaelurus buergeri* may consist of a species complex in the western Pacific. Further work is needed to evaluate the association of Philippine forms with those off Taiwan, Indonesia and Japan as differences in body shape and spotting appear to exist.

**Genus *Pentanchus* Smith & Radcliffe, in Smith, 1912. Onefin catsharks.**

Genus *Pentanchus* Smith & Radcliffe, in Smith, 1912b, Proc. U.S. Natn. Mus., 41(1872): 490. Type species: *Pentanchus profundicolus* Smith & Radcliffe, 1912, by original designation.

***Pentanchus profundicolus* Smith & Radcliffe, 1912. Onefin catshark.**

*Pentanchus profundicolus* Smith & Radcliffe, in Smith, 1912b, Proc. U.S. Natn. Mus., 41(1872): 490, fig., pl. 42. Holotype: U.S. National Museum of Natural History, USNM 70260, 508 (now 495) mm TL adult male, Albatross Sta. 5486, 10°02'N, 125°19'E, between Mindanao and Leyte Islands, Mindanao Sea, Philippine Islands, 1070 m.

**References:** *Pentanchus profundicolus*: Roxas & Martin, 1937: 12. Philippines. Fowler, 1941: 58. Philippines, holotype. Herre, 1953: 11. Philippines. Springer, 1979: 110. Philippines, holotype. Compagno, 1984: 345, fig. Philippines, holotype. Compagno, 1988: 178. Philippines. Compagno & Niem, 1998: 1291, fig. Western Central Pacific, Philippines. Nakaya & Seret, 2000: 373, figs. 1–3. Philippines, additional specimen.

**Philippine material:** L. Compagno examined the holotype and also Museum National d'Histoire Naturelle, Paris, MNHN 1999–0270, a 377 mm immature male from Philippines, Tablas Straits between Mindoro and Panay, 12°20'N, 121°41'E, 673–675 m (Nakaya & Seret, 2000). Not otherwise examined by the WWF elasmobranch biodiversity project.

**Remarks:** This species was long known only from the holotype but an additional specimen was recently discovered and described by Nakaya & Seret (2000).

**Genus *Scyliorhinus* Blainville, 1816. Spotted catsharks.**

Subgenus *Scyliorhinus* Blainville, 1816 (Genus *Squalus* Linnaeus, 1758), Bull. Sci. Soc. Philomat. Paris, (8): 121. Type species: “*Scyliorhinus canicula* Blainville”, by subsequent designation of Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 407; equals *Squalus canicula* Linnaeus, 1758.

**?*Scyliorhinus garmani* (Fowler, 1934). Brownspeckled catshark.**

*Halaelurus garmani* Fowler, 1934, Proc. Acad. Nat. Sci. Philadelphia, 85: 235, fig. 1. Holotype, U.S. National Museum of Natural History, USNM 43749, 240 mm TL female, RV Albatross Philippine Expedition, 1907–10, ‘East Indies’, no specific station data? Status of holotype confirmed by Howe & Springer (1993, Smiths. Contr. Zool. [540]: 7), by L.J.V. Compagno’s examination of the specimen, and by a search (February 12, 2002) on the USNM fish collection database.

**References:** *Halaelurus garmani*: Fowler, 1941: 49, fig. 1. East Indies, illustration of holotype, no Philippine records. Herre, 1953: 11. Three specimens from Dumaguete, Oriental Negros Province, 340–380 mm TL, in Silliman University collection, now lost? Springer, 1979: 135. East Indies. *Scyliorhinus garmani*: Compagno, 1984: 362. Compagno, 1988: 124. Compagno & Niem, 1998: 1292, fig. Western Central Pacific, including Dumaguete, Philippines.

**Philippine material:** No confirmed Philippine specimens were examined, although the holotype, USNM–43749, was examined by L. Compagno. It is possible, however that the “East Indies” locality of USNM–43749,

collected by the RV *Albatross* on its 1907 to 1910 Philippine Expedition, was erroneous and that the holotype came from the Philippines.

**Remarks:** Philippine records need confirmation.

**?*Scyliorhinus torazame* (Tanaka, 1908). Cloudy catshark.**

*Catulus torazame* Tanaka, 1908, J. Coll. Sci. Imp. Univ. Tokyo, 23(7): 6, pl. 2, fig. 2. Holotype: Department of Zoology, University Museum, University of Tokyo, Tokyo, Japan, ZUMT 953, 449 mm TL adult male, Misaki, Sagami Sea, Honshu, Japan, specimen lost according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Scyliorhinus torazame*: Herre, 1953: 12. Herre reported on two specimens from Dumaguete, Oriental Negros Province, 225 and 330 mm TL, in Silliman University collection, apparently no longer in existence. Nakaya, 1975: 21. Range, listed for Oriental Negros Province by Springer, 1979: 146. Springer suggested that Nakaya's record was not *S. torazame*. Compagno, 1984: 367, fig. Distribution, Philippines records questionable. Compagno, 1988: 124, Philippine records nominal. Compagno & Niem, 1998: 1292. Western Central Pacific, Philippines records need confirmation. Fowler (1941) only mentioned records of *S. torazame* from Japan and Korea.

**Philippine material:** No Philippine specimens of *Scyliorhinus torazame* were examined and none was present in the Stanford fish collection, though L. Compagno examined material of this species from Hokkaido and Honshu, Japan.

**Remarks:** Philippine records of the Western North Pacific *Scyliorhinus torazame* need confirmation. It is possible but not certain that Herre's records from Dumaguete are based on the undescribed *Cephaloscyllium* from Palawan listed above. Apart from generic differences, the new *Cephaloscyllium* is a considerably larger species than *S. torazame*, and has bolder spotting.

**Family Proscylliidae Fowler, 1941. Finback catsharks.**

Subfamily Proscylliinae Fowler, 1941 (Family Scyliorhinidae), Bull. U.S. Nat. Mus., (100), 13: 25. Type genus: *Proscyllium* Engelhardt, 1912.

**Genus *Eridacnis* Smith, 1913. Ribbontail catsharks.**

Genus *Eridacnis* Smith, 1913, Proc. U.S. Nat. Mus. 45(2003): 599. Type species: *Eridacnis radcliffei* Smith, 1913, by original designation).

***Eridacnis radcliffei* Smith, 1913. Pygmy ribbontail catshark.**

*Eridacnis radcliffei* Smith, 1913, Proc. U.S. Nat. Mus., 45(2003): 599, figs. 1–3. Holotype: U.S. National Museum of Natural History, USNM-74604, 230 mm TL adult (pregnant) female, 6° 11.8'N, 121° 08.3'E, off Jolo Light, Jolo Is., Sulu Archipelago, Philippine Islands, 295 m.

**References:** *Eridacnis radcliffei*: Roxas & Martin, 1937: 14. Philippines. Fowler, 1941: 200. Philippine specimens. Herre, 1953: 21. Off Capitancillo Island, between Leyte and Cebu; Apo Island off southern Negros, Oriental Negros Province; off Macabalan Point, Misamis Oriental Province; and off Port Tagolo, Zamboanga Province, Mindanao; Balukbaluk Island, west of Basilan, Sulu Province Compagno, 1984: 373, fig. Distribution, Philippines. Compagno, 1988: 188, pl. 2a. Distribution, Philippine specimens including holotype. Compagno & Niem, 1998: 1295, fig. Philippines.

**Philippine material:** USNM holotype and other USNM and CAS specimens examined by L. Compagno: CAS-33796, four adult males, 195–224 mm TL, 234 mm TL adult female, Silangan Point; CAS-33801, 166 mm TL immature male, two maturing males, 185–193 mm TL, two adult males, 205–211 mm TL, four immature females, 162–177 mm TL, three adult females, 196–219 mm TL, NE of Mompag Island; CAS-33834, 215 mm TL adult female, Barrio Cawit; CAS-33866, four adult males, 195–219 mm TL, 154 mm TL immature female, three adult females 191–212 mm TL, N. of San Andres Island; CAS-34048, 209 mm TL adult male, N. of San Andres Island; CAS-34140, 146 mm TL immature male, two adult males, 211–226 mm TL, three adult females, 231–237 mm TL, N. of San Andres Island; CAS-34159, two adult males, 193–221 mm TL, two adult females, 196–197 mm TL, Barrio Buliasnin; CAS-34168, 226 mm TL adult female, Barrio Cawit; CAS-34252, 234 mm TL adult female, E. of Gaspar Island; CAS-34280, 223 mm TL adult female, NW. of San Andres Island; CAS-34922, three adult males, 204–220 mm TL, 198 mm TL adult female, N. of Banot Island; above Philippine lots (eleven) from vicinity of Marinduque; USNM-93416, two adult females, 217–233 mm TL, Pt.



Tagolo Light, Mindanao, 8°48'N, 123° 31'E; USNM-93417, 120 mm TL immature male, 186 mm TL adult male, three immature females, 119–135 mm TL, Capitancillo Island Light, between Leyte and Cebu, 11° 10'N, 124° 17.15'E; USNM-93418, 242 mm TL adult female, Apo Island, between Negros and Siquijor, 9° 11'N, 123° 23'E (dissected); CAS-uncat. 121 mm TL immature male, four adult males, 196–214 mm TL, 225 mm TL adult female, Dagapas bay; CAS-uncat., 203 mm TL adult female, Balayan Bay; CAS-33560, 160 mm TL immature male, 183 mm TL maturing male, three immature females, 132–148 mm TL, 199 mm TL adult female, Balayan Bay, S. of Calaca Town; CAS-34434, two adult males, 187–225 mm TL, Balayan Bay, SE. of San Pedrino Point; CAS-34569, 207 mm TL adult male, Balayan Bay, S. of Barrio Sipating; CAS-34861, five adult males, 203–224 mm TL, 230 mm TL adult female, Balayan Bay, S. of Cape Santiago; lots (five) from Balayan and Dagapas Bays from Batangas; USNM-74604, 222 mm TL adult female, Jolo, Sulu Island, 6° 11.9'N, 121° 8.2'E, holotype of *Eridacnis radcliffei* Smith, 1913.

**Remarks:** This dwarf species, which is among the smallest of living sharks, has a broad if sporadic range in the Indo–West Pacific from East Africa to the Philippines. Specimens from across its range need to be critically compared to determine if they are all the same species.

**?*Eridacnis* sp. 1. Philippine ribbontail catshark.**

**Philippine material:** 9 whole, Dipolog City Public Market; Yardahan, Basay; Punta Miray, Baliangao, JPAG 244, female, 220 mm TL, March 25, 2000; BRU 004, female, 244 mm TL, January 20, 1999; BRU 064, female, 242 mm TL, April 10, 1999; BRU 067, female, 220 mm TL, April 10, 1999; JPAG 007, female, 242 mm TL, January 20, 1999; BRU 063, female, 244 mm TL, April 10, 1999; BRU 065, female, 240 mm TL, April 10, 1999; BRU 066, female, 220 mm TL, April 10, 1999; BRU 068, female, 236 mm TL, April 10, 1999.

**Remarks:** This may be an undescribed species of *Eridacnis* with the first dorsal fin originating well behind the free rear tips of the pectoral fin rather than above the pectoral-fin insertion (in *Eridacnis radcliffei* as figured by Smith, 1913, Compagno, 1984, and Compagno, 1988).

**Family Pseudotriakidae Gill, 1893. False catsharks.**

Subfamily Pseudotriacinae Gill, 1893, Natn. Acad. Sci. USA, Mem. 6, 6: 130 (Family Scylliorhinidae). Emended and raised in rank as the family Pseudotriakidae by Jordan & Evermann, 1896, Bull. U.S. Nat. Mus. (47), 1: 26. Type genus: *Pseudotriakis* Capello, 1868.

Subfamily Golluminae Compagno, 1988, Sharks Ord. Carcharhiniformes: 192 (Family Proscylliidae). Type genus: *Gollum* Compagno, 1973. This genus was originally assigned to Proscylliidae (Compagno, 1988) but transferred to Pseudotriakidae by Compagno (1999).

**Genus *Gollum* Compagno, 1973. Gollum sharks.**

Genus *Gollum* Compagno, 1973, Proc. California Acad. Sci., ser. 4, 39(14): 264. Type species: *Triakis attenuata* Garrick, 1954, by original designation.

***Gollum* sp. 1. Sulu gollum.**

**Philippine material:** 7 whole, Liberty, Bagong Sikat, Puerto Princesa City, JPAG 230, female, 536 mm TL, March 16, 2000; JPAG 233, female, 668 mm TL, March 16, 2000; JPAG 234, female, 638 mm TL, March 16, 2000; JPAG 235, mature male, 593 mm TL, March 16, 2000; JPAG 237, mature male, 595 mm TL, March 16, 2000; JPAG 229, male, 589 mm TL, March 16, 2000; JPAG 237a, female, 533 mm TL, March 16, 2000.

**Remarks:** Undescribed species collected during the WWF elasmobranch biodiversity project. The genus was hitherto known only from the Coral Sea and off New Zealand as *Gollum attenuatus* (Garrick, 1954). The Philippine species is possibly endemic to the Sulu Sea. A third species of *Gollum* collected recently off New Caledonia also appears to be undescribed (Seret & Last, in prep).

## Family Triakidae Gray, 1851. Houndsharks.

Tribe Triakiana Gray, 1851 (Family Squalidae), List Fish British Mus., Pt. 1, Chondropterygii: 108. Type genus: *Triakis* Müller & Henle, 1838.

**Remarks:** Casto de Elera (1885) recorded *Galeus canis* Bonaparte, 1834 (= *Galeorhinus galeus* [Linnaeus, 1758]) from the Philippines. The identity of this record is uncertain, but it is less likely to be based on *Galeorhinus* than on *Hemitriakis*.

### Genus *Hemitriakis* Herre, 1923. Combtooth houndsharks.

Genus *Hemitriakis* Herre, 1923, Philippine J. Sci. 23(1): 70. Type species: *Hemitriakis leucoperiptera* Herre, 1923 by original designation.

**Specimens of uncertain identity (need to be radiographed):** *Hemitriakis* cf. *japanica* (var PP), 4 whole, 1 without internal organs, Palapala Fish Port, Cadiz City; Iloilo City Fish Port; Pasil Fish Market, Cebu, BRU 022, female, 1,041 mm TL, February 11, 1999; JPAG 139, male, 787 mm TL, April 21, 1999; BRU 023, immature male, 1,150 mm TL, February 11, 1999; JPAG 022, immature male, 787 mm TL, February 11, 1999; JPAG 020, female, 973 mm TL, February 11, 1999. *Hemitriakis leucoperiptera*, Pasil Fish Market, Cebu City, JPAG 161, female, 609 mm TL, April 22, 1999; *Hemitriakis* sp., Palapala fish Port, Cadiz City, BRU 086, female, 880 mm TL, April 16, 1999. An additional specimen, USNM-325700, listed as *Hemitriakis leucoperiptera* on the USNM fish collection database (USNM URL 2002), from Negros, Philippines, ca 10°N, 122°E by Gavin Naylor on October, 1987, was not examined during the WWF elasmobranch biodiversity project and its identity cannot be confirmed.

### *Hemitriakis leucoperiptera* Herre, 1923. Whitefin tope.

*Hemitriakis leucoperiptera* Herre, 1923, Philippine J. Sci. 23(1): 71, pl. 1. Holotype: 955 mm TL pregnant female with 12 fetuses, Dumaguete, Negros, Philippine Islands, in collection of Department of Agriculture, Bureau of Science, Manila collection; entire collection destroyed during World War II according to Herre (1953) and Eschmeyer (1998, Catalog of Fishes CD-ROM), so the holotype and her young are probably lost. Two specimens examined by L. Compagno, Stanford University SU-27118, 169 mm TL male and 170 mm TL female fetuses from Dumaguete and collected and labelled as *H. leucoperiptera* by Herre, are presumably not part of the type series as they are considerably smaller than the 12 fetuses (200–218 mm TL) obtained from the holotype and measured by Herre (1923).

**References:** *Hemitriakis leucoperiptera*: Roxas & Martin, 1937: 14. Philippines. Herre, 1953: 22. Dumaguete, Oriental Negros Province, Negros; also sites Umali's record from Bagac Bay, Bataan Province, caught off motorship *Theodore N. Gill* in October 1947. This was an immature female, 522 mm TL long, caught in 26 fa. (ca 48 m); its disposition is unknown, and it apparently was not accessioned into in the Stanford collection. Compagno, 1970: 63. Philippines, vertebral counts. Compagno, 1988: 232–233, fig. 17.11b. Philippines, fetal coloration. Compagno & Stevens, 1993c: 195–219. Philippine specimens. Compagno & Niem, 1998: 1302, fig. Philippines. *Triakis leucoperiptera*: Fowler, 1941: 197. Philippines, no material.

**Philippine material:** SU-27118, 169 mm TL male and 170 mm TL female (dissected) fetus, Dumaguete, Negros Is., identified as *H. leucoperiptera* by A.W. C. T. Herre and examined by L. Compagno. Palapala Fish Port, Cadiz City; Iloilo City Fish Port; Pasil Fish Market, Cebu, BRU 159, mature male, 877 mm TL, April 6, 2000; JPAG 021, female, 878 mm TL, February 11, 1999; Pasil Fish Market, Cebu City, JPAG 169, female, 588 mm TL, April 22, 1999.

**Remarks:** The destruction of the holotype of *Hemitriakis leucoperiptera* (including fetuses) raises problems for identification of Philippine *Hemitriakis*, and suggests that the designation of a neotype is in order. The problems stem from the existence of two species of *Hemitriakis* in the Philippines, both collected from Dumaguete. The second species, the ocellate topeshark (*Hemitriakis* sp. near *H. complicofasciata* Takahashi and Nakaya, 2004) is known locally from four fetuses (SU-40097) and was originally identified by Herre as *Triakis scyllium*. Compagno (1988) and Compagno & Stevens (1993c) found that fetuses and postnatal specimens of some species of *Hemitriakis* differed markedly in coloration, while adults were more or less similar in coloration but differed in subtle differences in morphometrics and greater differences in vertebral counts. The two SU-27118 fetuses are mostly plain-coloured, as were the holotype fetuses of *H. leucoperiptera* (Herre, 1923), while the SU-40097 fetuses have prominent dark, light-centered rings or ocelli on their bodies, fins and tails. The SU-27118 specimens have far lower vertebral counts, 34–35 monospondylous precaudal (MP) centra and 94–96 precaudal (PC) centra, than the ocellate topeshark, with 44 MP centra and 116 PC centra for one fetus. Three large (588 to 878 mm) *Hemitriakis* collected by the WWF elasmobranch biodiversity project, BRU 159, JPAG

021, and JPAG 169, were radiographed at the Shark Research Center in Cape Town. These agreed with the SU-27118 fetuses in their low vertebral counts (35–39 MP and 94–99 PC centra) and with Herre's (1923) description of *Hemitriakis leucoperiptera* in morphology and coloration. For the purposes of nomenclature, we have assumed that the five, low-count Philippine specimens, including the two plain fetuses, are conspecific with *H. leucoperiptera*, while the higher-count, ocellate fetuses are closer to but not necessarily conspecific with *Hemitriakis complicofasciata*.

***Hemitriakis* sp. near *H. complicofasciata* Takahashi and Nakaya, 2004. Ocellate tope.**

**References:** ?*Triakis scyllium*: Herre, 1953: 25. Herre refers to a 1933–34 collection from Dumaguete, Oriental Negros Province, Negros, which may refer in whole or part to *Hemitriakis* sp. rather than the Western North Pacific, temperate-water *Triakis scyllium*. *Hemitriakis* sp.: Compagno, 1970: 76. based on SU-40097. Compagno, 1988: 232–233, fig. 17.11c. Philippines, fetal coloration. Compagno & Stevens, 1993c: 197–211. Philippines, vertebral count. Compagno & Niem, 1998: 1301. Philippines.

**Philippine material:** SU-40097, 171 mm TL male and three female fetuses, 161–180 mm TL, Dumaguete, Negros Is., Philippine Islands, labelled *Triakis scyllium* by A. W. C. T. Herre.

**Remarks:** Compagno (1970, 1988) and Compagno & Stevens (1993c) provided data on external morphology, vertebral counts and coloration of the four SU-40097 juvenile specimens. This is close to the recently described *Hemitriakis complicofasciata* Takahashi & Nakaya, 2004 from the nearby Ryu-Kyu Islands and Taiwan, but differs in having a less elaborate color pattern and in lower vertebral counts including monospondylous precaudal, diplospondylous precaudal, and precaudal vertebral counts.

**Genus *Iago* Compagno & Springer, 1971**

Genus *Iago* Compagno & Springer, 1971, Fish. Bull. 69: 615. Type species: *Eugaleus omanensis* Norman, 1939 by original designation.

***Iago garricki* Fourmanoir, 1979. Longnose houndshark.**

*Iago garricki* Fourmanoir, 1979, Nature Caledonienne (16): 11, 2 figs. (Sept. 1979). Also, Fourmanoir & Rivaton, 1979, Cahiers L'Indo-Pacifique, Oct. 1979(4): 434, fig. 22. Holotype, Museum National D'Histoire Naturelle, Paris, MNHN 1978–694, 620 mm TL female, possibly adult. Type locality, Vate, New Hebrides, 250–320 m.

**References:** *Iago* cf. *garricki*: Compagno, 1988: 239–240. Philippine specimens. *Iago garricki*: Last & Stevens, 1994: 212, fig. pl. 28. Distribution off Australia, not recorded for Philippines. Compagno & Niem, 1998: 1303, fig. Possibly from Philippines (Batangas, Luzon).

**Philippine material:** California Academy of Sciences, CAS-34447, 195 mm TL immature male, Batangas Bay E. of Talaga, Batangas, Philippines; CAS-34549, 252 mm TL immature male, Balayan, SE. of Pagapas Bay, Batangas, Philippines. Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-01-95, 19950922, 174–190 m, 13°10.26–10.23'N, 123°50.20–52.37'E, adult male, 343 mm TL, 265 mm PCL; FR1-PHI-02-95, 19950923, 363–385 m, 13°08.98–09.84'N, 124°04.72–00.01'E, 4 specimens: female, 267 mm TL, 205 mm PCL; immature male, 251 mm TL, 194 mm PCL; immature male, 244 mm TL, 188 mm PCL; immature male, 234 mm TL, 175 mm PCL. 27 whole, Bukana, Sikayab, Dapitan City; Pasil Fish Port I, Cebu City; Dipolog City Public Market, JPAG 269, mature male, 476 mm TL, March 29, 2000; JPAG 270, female, 532 mm TL, March 29, 2000; JPAG 108, mature male, 435 mm TL, April 17, 1999; JPAG 083, mature male, 459 mm TL, April 17, 1999; JPAG 146, female, 492 mm TL, April 17, 1999; JPAG 152, female, 651 mm TL, April 17, 1999; JPAG 153, female, 428 mm TL, April 17, 1999; JPAG 295, male, 379 mm TL, April 8, 2000; JPAG 293, mature male, 432 mm TL, April 8, 2000; JPAG 294, mature male, 416 mm TL, April 8, 2000; JPAG 335, mature male, 383 mm TL, April 13, 2000; JPAG 336, female, 377 mm TL, April 13, 2000; JPAG 337, mature male, 397 mm TL, April 13, 2000; JPAG 338, mature male, 397 mm TL, April 13, 2000; JPAG 339, mature male, 436 mm TL, April 13, 2000; JPAG 340, mature male, 418 mm TL, April 13, 2000; JPAG 343, female, 450 mm TL, April 13, 2000; JPAG 344, female, 575 mm TL, April 13, 2000; JPAG 345, female, 517 mm TL, April 13, 2000; JPAG 346, mature male, 393 mm TL, April 13, 2000; JPAG 347, female, 440 mm TL, April 13, 2000; JPAG 348, female, 379 mm TL, April 13, 2000; JPAG 349, mature male, 406 mm TL, April 13, 2000; JPAG 350, immature male, 353 mm TL, April 13, 2000; JPAG 292, female, 372 mm TL, April 8, 2000; JPAG 084, mature male, 466 mm TL, April 15, 1999; JPAG 094; SUML 003, mature male, 456 mm TL, collected between January and May, 1999.

**Remarks:** The WWF elasmobranch biodiversity project did extensive analysis of morphometrics and meristics of the large collection of Philippine *Iago* collected by the project and compared it with the holotype of *I. garricki* from New Caledonia. One of us (Compagno, 1988) had suggested that the Philippine *Iago* might be a separate species, but this was based on a small sample of juveniles (the holotype of *I. garricki* is an adult). Our analysis could find nothing to separate *I. garricki* from the Philippine *Iago*, and we concluded that the Philippine, Australian, and New Caledonian longnosed houndsharks are a single species, *I. garricki*.

**Genus *Mustelus* Linck, 1790. Smoothhounds.**

Genus *Mustelus* Linck, 1790, Mag. Neueste Phys. Naturg. Gotha 6: 31. Type species: *Squalus mustelus* Linnaeus, 1758 by suspension of the Rules by the International Commission on Zoological Nomenclature, Opinion 93, 1926.

**Remarks:** Fowler (1941) and Herre (1953) lacked Philippine specimens or records of *Mustelus*. The systematics of this genus were most recently reviewed by Heemstra (1973) and Compagno (1984), but there are continuing problems with identification of species in poorly known parts of the Indo–West Pacific including the Philippines and the possibility exists that undescribed species occur in the area.

***Mustelus* cf. *manazo* Bleeker, 1854. Philippine white-spotted smoothhound.**

?*Mustelus manazo* Bleeker, 1854, Nat. Tijdschr. Neder. Indië, 1854, 6: 422. Syntypes: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH–7396, 350–460 mm TL, Nagasaki Market, Japan.

**Philippine material:** 17 whole, 1 with fins missing, Pasil Fish Port I, Cebu City; Isla Verde, Pulu, Dapitan City; Palapala Fish Port, Cadiz City; JPAG 316, male, 778 mm TL, April 12, 2000; JPAG 318, female, 777 mm TL, April 10, 2000; JPAG 319, female, 828 mm TL, April 12, 2000; JPAG 072, immature male, 600 mm TL, April 9, 1999; JPAG 142, female, 551 mm TL, April 9, 1999; JPAG 069, female, 718 mm TL, April 8, 1999; JPAG 071, female, 594 mm TL, April 9, 1999; JPAG 155, male, 539 mm TL, April 9, 1999; JPAG 070, female, 576 mm TL, April 8, 1999; BRU 156, mature male, 807 mm TL, April 6, 2000; BRU 157, mature male, 758 mm TL, April 6, 2000; BRU 158, female, 710 mm TL, April 6, 2000; BRU 182, mature male, 755 mm TL, April 10, 2000; BRU 183, mature male, 753 mm TL, April 10, 2000; BRU 098, immature male, 657 mm TL, April 18, 1999; BRU 099, female, 678 mm TL, April 18, 1999; JPAG 162, female, 968 mm TL, April 23, 1999; JPAG 135, mature male, 674 mm TL, April 22, 1999; JPAG 073, female, 575 mm TL, collected between January and May, 1999; JPAG 068, unknown TL, unknown sex, collected between January and May, 1999.

**Remarks:** Several species of white-spotted smoothhounds, usually tentatively identified as *Mustelus manazo*, appear to exist in the Indo–Pacific. Some of these are likely to be undescribed but a comprehensive study of the group is needed to resolve their taxonomy.

***Mustelus* cf. *griseus* Pietschmann, 1908. Philippine grey smoothhound.**

?*Mustelus griseus* Pietschmann, 1908a, Anz. k. Akad. Wiss. Wien, 45: 132; also Pietschmann, 1908, Sitzber. k. Akad. Wiss. Wien, 107: 694, pl. 2, fig. 1. Holotype: Naturhistorisches Museum Wien, NMW–85501, 633 mm TL immature or adolescent male, Yokohama, Japan.

**Reference:** *Mustelus griseus*: Compagno & Niem, 1998: 1304. Possibly Philippines.

**Philippine material:** *Mustelus* sp. near *griseus*. L. Compagno–19951005, 737 mm TL, 590 mm PCL adult male, Navotas Market, Manila, 5 Oct. 1995, in SAM collection.

**Remarks:** The Navotas specimen fits *Mustelus griseus* in Compagno's (1984: 398) key and description and is characterized as follows: head short, prepectoral length 19.3% TL; snout moderately long and narrowly rounded-angular in dorsoventral view, preoral snout 5.8% TL, preorbital snout 7.0% TL; internarial space 2.5% TL; eyes 2.8% TL, interorbital space broad, 5.7% TL; lower labial furrows longer than uppers, upper labial furrows 0.9% TL and length of upper 0.9% of lower; mouth elongated, somewhat greater than eye length and length 3.8% TL; cusps low on teeth but present; lateral trunk denticles lanceolate, with ridges extending entire length of crown; buccopharyngeal denticles covering the anterior two-thirds of the palate and mouth floor; interdorsal space 20.8% TL, anal–caudal space greater than second dorsal height and 8.4% TL; pectoral fins falcate, pectoral fin anterior margin 12.8 and posterior margin 8.2% TL; pelvic fins falcate, anterior margins 7.5% TL; dorsal fins falcate, first dorsal with mostly vertical posterior margin anterior to insertion, first dorsal with naked posterior margin, without denticles but not abruptly darker and frayed, midbase of first dorsal fin about equidistant between pectoral and pelvic bases; anal fin height 3.1% TL; ventral caudal lobe expanded and falcate; total vertebral (TC) counts 137, monospondylous precaudal (MP) centra 33, diplospondylous precaudal (DP) centra 53, diplospondylous caudal (DC) centra 51, precaudal (PC) centra 86; rostral cartilages not

hypercalcified; size moderate, adult male 737 mm TL; colour grey above, white below, no white or dark spots. The Navotas specimen agrees with six specimens of *M. griseus* from China and Japan in vertebral counts except for slightly higher DP, PC and TC counts (DP 48–51, PC 79–85 and TC 131–134 in *M. griseus* examined). We hesitate to include the Philippine grey smoothhound in *M. griseus* because of a slightly greater interorbital space (3.6 to 4.5% TL in *M. griseus*), possibly more extensive buccopharyngeal denticles, slightly more falcate dorsal, anal and pelvic fins, and because we weren't able to examine a series of this shark and directly compare it with a series of *M. griseus*.

***Mustelus* sp. 1. Philippine brown smoothhound.**

?*Mustelus griseus* Pietschmann, 1908, Anz. k. Akad. Wiss. Wien, 45: 132; also Sitzber. k. Akad. Wiss. Wien, 107: 694, pl. 2, fig. 1. Holotype: Naturhistorisches Museum Wien, NMW-85501, 633 mm TL immature or adolescent male, Yokohama, Japan.

**Philippine material:** 1 whole, Pasil Fish Market, Cebu City, JPAG 131, mature male, 738 mm TL, April 23, 1999.

**Remarks:** The only uniformly brown coloured *Mustelus* known from the Indo–West Pacific. Possibly undescribed. It needs to be compared in detail with the Philippine grey smoothhound above.

**?Genus *Triakis* Müller & Henle, 1838. Leopard sharks.**

Genus *Triakis* Müller & Henle, 1838a, Mag. Nat. Hist., n. ser., 2: 36; Müller & Henle, 1838, Arch. Naturg. 4: , p. 84 (no species mentioned); Müller & Henle, 1839, Syst. Besch. Plagiost., pt. 1: 63. Type species: *Triakis scyllium* Müller & Henle, 1839 by monotypy.

**?*Triakis scyllium* Müller & Henle, 1839. Banded houndshark.**

*Triakis scyllium* Müller & Henle, 1839, Syst. Besch. Plagiost., pt. 2: 63, pl. 26. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH, dried specimen, Japan.

**References:** ?*Triakis scyllium*: Herre, 1953: 25. Specimens from Dumaguete. Fowler (1941) did not have any records of this species from the Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) referred to a 1933–34 collection of *Triakis scyllium* from Dumaguete, Oriental Negros Province, Negros, of uncertain disposition and to our knowledge the only records of this species from Philippines. It is possible that four fetal specimens (SU-40097) from Dumaguete deposited in the Stanford University fish collection were from this collection, as they were labelled *T. scyllium* by Herre. These are close to the recently described *Hemitriakis complicofasciata* from Japan and Taiwan (see above), and call into question the presence of the temperate-water *T. scyllium* in the Philippines.

**Family Hemigaleidae Hasse, 1879. Weasel sharks.**

Family Hemigalei or Hemigaleus Hasse, 1879, Natürliche System Elasmobranchier, Allgem. Th.: 4, 53.

**Genus *Hemigaleus* Bleeker, 1852. Weasel sharks.**

Genus *Hemigaleus* Bleeker, 1852, Verh. Batav. Genoots. Kunst. Wet. 24: 45. Type species: *Hemigaleus microstoma* Bleeker, 1852 by subsequent designation of Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 402.

***Hemigaleus microstoma* Bleeker, 1852. Sicklefins weasel shark.**

*Hemigaleus microstoma* Bleeker, 1852, Verh. Batav. Genoots. Kunst. Wet. 24: 46, pl. 2, fig. 9. Syntypes: Two specimens, 625 and 701 mm TL females, are mentioned in Bleeker's (1852) original description. One of these is a specimen in the British Museum (Natural History), BMNH 1867.11.28.173, 703 mm TL female, but the other may be lost (Dr. M. Boeseman, *pers. comm.*). Type locality, Batavia (Jakarta), Java.

*Hemigaleus machlani* Herre, 1929, Philipp. J. Sci. 40(2): 231. Holotype: 773 mm PCL, est. 106 cm TL, Jolo, Sulu Province, Philippines, apparently lost according to J.A.F. Garrick (*in* Compagno, 1988, Sharks Order Carcharhiniformes: 263).

**References:** *Hemigaleus machlani*: Roxas & Martin, 1937: 14. Philippines. Fowler, 1941: 182. Philippines. Herre, 1953: 22. Philippines. *Hemigaleus microstoma*: Compagno, 1984: 439, fig. *H. machlani* a possible synonym, Philippines. Compagno, 1988: 263–264. *H. machlani* possibly synonymous, holotype lost. Last & Stevens, 1994: 218, fig, pl. 28. Distribution, questionable for Philippines. Compagno & Niem, 1998: 1309, fig. Distribution, Philippines.

**Philippine material:** 3 whole, 5 with fins missing, Puerto Princesa Public Market; Palapala Fish Port, Cadiz City, BRU 125, immature male, 489 mm TL, March 15, 2000; BRU 124, female, 551 mm TL, March 15, 2000; BRU 123, female, 612 mm TL, March 15, 2000; JPAG 219, immature male, 543 mm TL, March 12, 2000; JPAG 222, female, 541 mm TL, March 12, 2000; JPAG 216, immature male, 584 mm TL, March 14, 2000; BRU 081, male, 562 mm TL, April 16, 1999; BRU 082, female, 570 mm TL, April 16, 1999.

**Remarks:** *Hemigaleus machlani* was briefly described by Herre (1929) without illustration and was considered a possible synonym of *H. microstoma* (Compagno, 1984). The WWF elasmobranch biodiversity project collected the first confirmed specimens of *H. microstoma* from the Philippines. Two of these (BRU 081 and 082) were radiographed and have relatively high precaudal vertebral counts (90 to 94) compared to two specimens from Java (81, including the surviving syntype), three specimens from the Gulf of Thailand (79 to 81), and one from Singapore (83); they agree, however, with two specimens from India and Sri Lanka with high counts (91 to 92). Stevens & Cuthbert (1983) showed that Australian *H. microstoma* differed from specimens from elsewhere in having much lower vertebral counts, higher tooth row counts, and black rather than white fin tips. More material needs to be examined, but it is possible that *H. microstoma* is a species complex or has complex variation within a single species (Compagno, 1988).

#### **Genus *Hemipristis* Agassiz, 1843. Snaggletooth sharks.**

Genus *Hemipristis* Agassiz, 1843, Recher. Poiss. Foss. 3: 237 Type species: *Hemipristis serra* Agassiz, 1843, fossil, by subsequent designation of Woodward, 1889, Cat. foss. fish. British Mus. (Nat. Hist), (1): 450.

#### ***Hemipristis elongatus* (Klunzinger, 1871). Snaggletooth shark.**

*Dirrhizodon elongatus* Klunzinger, 1871, Verh. Zool.-Bot. Ges. Wien, 21: 665. Holotype: Staatliches Museum für Naturkunde, Stuttgart, SMNS-1640, dried specimen, 2.3 M TL, “Kosseir” (Al-Qusayr), Egypt, Red Sea, 26°06'N, 34°17'E, apparently lost according to Fricke (1991, Stuttgarter Beitr. Naturk. A [473]: 7).

**References:** *Hemipristis elongatus*: Fowler, 1941: 143. Red Sea, no Philippine records. Compagno, 1984: 440, fig. Distribution, Philippines, record apparently from U.S. National Museum of Natural History, USNM-197387, collected from the Manila fish market and identified by Victor G. Springer, March 1962. Compagno, 1988: 272. No Philippine material. Last & Stevens, 1994: 219, fig, pl. 29. Distribution, including Philippines. Compagno & Niem, 1998: 1310, ill. Philippines.

**Philippine material:** 1 whole, Pasil Fish Market, Cebu City, JPAG 132, immature male, 1145 mm TL, April 21, 1999.

**Remarks:** Herre (1953) did not list this distinctive shark in his Philippine checklist.

#### **Family Carcharhinidae Jordan & Evermann, 1896. Requiem sharks.**

Subfamily Carcharhininae Jordan & Evermann, 1896, Bull. U.S. Nat. Mus. (47), pt. 1: 28 (Family Galeidae). Type genus: *Carcharhinus* Blainville, 1816.

**Remarks:** Additional species of carcharhinid sharks, apart from those mentioned under *Carcharhinus* and *Rhizoprionodon*, may be eventually recorded from Philippine waters. The rare to uncommon broadfin shark, *Lamiopsis temmincki* (Müller & Henle, 1839) is known from adjacent areas in the South China Sea.

#### **Genus *Carcharhinus* Blainville, 1816. Grey sharks.**

Subgenus *Carcharhinus* Blainville, 1816, Bull. Sci. Soc. Philomat. Paris, (8): 121 (Genus *Squalus* Linnaeus, 1758). Type species: *Carcharias melanopterus* Quoy & Gaimard, 1824, under suspension of the Rules by the International Commission on Zoological Nomenclature, Opinion 723, 1965, Bull. Zool. Nomencl. 22: 32.

**Remarks:** Several species of this widespread and diverse genus have not been definitely recorded from the Philippines but are to be expected as they occur in adjacent areas in the South China Sea: Pigeye or Java shark, *Carcharhinus amboinensis* (Müller & Henle, 1839), from inshore coastal environments; Galapagos shark,

*Carcharhinus galapagensis* (Snodgrass & Heller, 1905), from near offshore islands; dusky shark, *Carcharhinus obscurus* (Lesueur, 1818), from inshore and semioceanic along the edges of the shelves; sandbar shark, *Carcharhinus plumbeus* (Nardo, 1827), of which there are a possible set of jaws from the Philippines that could not be confirmed; and false smalltail shark, *Carcharhinus* sp. cf. *porosus* (Ranzani in Allesandrini, 1839). Garrick (1982), Compagno (1988), and Compagno & Niem (1998) had no Philippine specimens or records of any of these species.

***Carcharhinus albimarginatus* (Rüppell, 1837). Silvertip shark.**

*Carcharias albimarginatus* Rüppell, 1837, Neue Wirbelth. Fauna Abyssinien gehör., Fische rothen Meeres (1835–1838): 64, pl. 18, fig. 1. Syntypes: several specimens taken but none designated as types according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 116). Lectotype; Naturmuseums Senckenberg, SMF 3582, ca. 1000 mm TL stuffed and mounted immature male, Ras Mehamet, Red Sea, designated by Klausewitz (1960, Senckenbergiana Biol. 41: 293).

**References:** *Eulamia albimarginata*: Fowler, 1941: 174. No Philippine records. *Carcharias albimarginatus*: Herre, 1953: 17. Umali, motorship *Theodore N. Gill*, May 1948, Sulu Sea, Sulu Province, size and disposition of specimen not mentioned. *Carcharhinus albimarginatus*: Garrick, 1982: 116, figs. 53–54. Stanford University, SU–13667, 683 mm TL female fetus, collected in 1931 by A.W.C.T. Herre from Dumaguete, Oriental Negros, but not listed as such in Herre (1953). Compagno, 1984: 455, fig. World distribution, Philippines. Compagno, 1988: 323, no Philippine specimens examined. Last & Stevens, 1994: 228, fig. pl. 31. Distribution, including Philippines. Compagno & Niem, 1998: 1325, fig.. Western Central Pacific, including Philippines.

**Philippine material:** None examined.

**Remarks:** Several seen during dives to Tubbathara Reef (central Sulu Sea) at about 30 m depth by one of us (P. Last), April 2000.

***Carcharhinus altimus* (Springer, 1950). Bignose shark.**

*Eulamia altima* Springer, 1950, Amer. Mus. Novit. (1451): 9\* Holotype: U.S. National Museum of Natural History, USNM–133828, 52" or 1321 mm (1225 mm) TL immature female, partly skinned, from off Cosgrove Reef, Florida Keys at 197 m.

**References:** *Carcharhinus altimus*: Garrick, 1982: 142, figs. 64–65. Distribution, no Philippine records. Compagno, 1984: 457, fig. Distribution, no Philippine records. Compagno, 1988: 323. Distribution, no Philippine specimens. Last & Stevens, 1994: 230 fig. pl. 34. Distribution, no Philippine records. Compagno & Niem, 1998: 1326, fig. Distribution in Western Central Pacific, no Philippine records.

**Philippine material:** Two whole, Palapala Fish Port, Cadiz City, BRU 160, immature male, 512 mm TL, April 6, 2000; BRU 184, female, 634 mm TL, April 10, 2000; BRU 185, female, 705 mm TL, April 10, 2000; photos, Suba, Pasil, Cebu City, JPAG 304, female, unknown TL, April 11, 2000. *Carcharhinus altimus* or *Carcharhinus plumbeus*, one pair dried jaws, San Jose Taytay JPAG 197, unknown sex, unknown TL, July 2, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. BRU 184 and BRU 185 (with fresh umbilical scars) agree with descriptions in cited references. JPAG 304 in the photo catalogue is also probably this species, although its snout appears shorter, the anterior margin of the first dorsal fin is not curved towards its apex, and its pectoral fins (additional photo) seem narrower than would be expected.

***Carcharhinus amblyrhynchoides* (Whitley, 1934). Graceful shark.**

*Gillisqualus amblyrhynchoides* Whitley, 1934, Mem. Queensland Mus. 10(4): 189, text fig. 4. Holotype: Queensland Museum, Brisbane, Queensland, Australia, QM–I.2003, 595 mm TL immature female, Cape Bowling Green, Queensland, Australia.

**References:** *Eulamia pleurotaenia*: Fowler, 1941: 166, fig. 8. Specimen illustrated, , *Albatross* sta. 6762, in U.S. National Museum of Natural History, USNM–151228, Manila market, Philippines. *Carcharias pleurotaenia*: Herre, 1953: 20. Two specimens collected by motorship *Spencer F. Baird*, from Gulf of Lingayen, Pangasinan Province, Luzon. *Carcharhinus amblyrhynchoides*: Garrick, 1982: 37, figs. 9–20. USNM–151228 from Manila examined. Compagno, 1984: 458, fig. World distribution, Philippines. Compagno, 1988: 323. USNM–151228 from Manila examined. Last & Stevens, 1994: 231, fig. pl. 33. Distribution, including Philippines. Compagno & Niem, 1998: 1327, fig. Philippines.

**Philippine material:** USNM-151228, 520 mm TL immature male, Manila market, Philippines. Possible adult, photos, Pasil Fish Port I, Cebu City, JPAG 305, female, unknown TL, April 11, 2000.

**Remarks:** JPAG 305 in photo collection from WWF elasmobranch biodiversity project may possibly be this species; however, there is no black tip to the first dorsal fin.

***Carcharhinus amblyrhynchos* (Bleeker, 1856). Grey reef shark.**

*Carcharias* (*Prionodon*) *amblyrhynchos* Bleeker, 1856, Nat. Tijdschr. Neder.-Indië, 10: 467. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH-7377, head and skin of ca. 1540 mm female, vicinity of Solombo Islands, Java Sea according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 111).

**References:** *Carcharias menisorrhah* in part ?Fowler, 1941: 161. Manila Bay. ?Herre, 1953: 20. Cebu, Cebu Province. *Carcharhinus amblyrhynchos*: Garrick, 1982: 106, figs. 48–49. U.S. National Museum of Natural History, USNM-151232, 621 mm TL female and 670 mm TL male, Luzon Point, Philippines. Compagno, 1984: 459, fig. General description, Philippines. Compagno, 1988: 323. No Philippine specimens. Last & Stevens, 1994: 232, fig, pl. 32. Distribution, including Philippines. Compagno & Niem, 1998: 1328, fig. Western Central Pacific, including Philippines.

**Philippine material:** None examined.

**Remarks:** Seen during dives to Tubbathara Reef (central Sulu Sea) by one of us (P. Last), April 2000.

**?*Carcharhinus borneensis* (Bleeker, 1858–1859). Borneo shark.**

*Carcharias* (*Prionodon*) *borneensis* Bleeker, 1858–59, Act. Soc. Sci. Indo-Neerl. (1858–1859) 5: 10. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH-7386, 238 mm male from sea at Singkawang, Borneo according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 182); holotype also examined by L. Compagno. Eschmeyer (1998, Catalog of Fishes, CD-ROM) notes that it is uncertain whether Bleeker's description of this species was published in 1858 or 1859.

**References:** *Carcharias borneensis*: Casto de Elera, 1895: 614. Samar and Barongan, Philippines. *Eulamia borneensis* Fowler, 1941: 167. Citation of Elera's record, no specimens. *Carcharhinus borneensis*: Garrick, 1982: 179, figs. 82–83. Specimens from Borneo and China. Compagno, 1984: 463, fig. Questionable records from Philippines. Compagno, 1988: 324. No Philippine material. Compagno & Niem, 1998: 1330, fig. Western Central Pacific, Borneo, China, and possibly Java and Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) didn't mention this species in his checklist. This rare and little-known species did not show up in a recent survey of cartilaginous fishes from Sabah (Malaysian Borneo) under the UK Darwin Initiative program, nor was it encountered by the WWF elasmobranch biodiversity project in the Philippines. It was recently rediscovered at the Mukah fish market, Sarawak (P. Last), where it seems to live in mesohaline habitats near the coast.

***Carcharhinus brevipinna* (Müller & Henle, 1839). Spinner shark.**

*Carcharias* (*Prionodon*) *brevipinna* Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 31, pl. 9. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH-2525, mounted skin of ca. 785 mm specimen, Java, according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 47).

**References:** *Aprionodon brevipinna*: Herre, 1953: 16. 990 mm specimen taken by motorship *Spencer F. Baird*, Oct. 1947, in Turung Bay, Malampaya Sound, Palawan. *Carcharhinus brevipinna*: Garrick, 1982: 41, figs. 21–22. No Philippine specimens. Compagno, 1984: 466, fig. Distribution, questionable from Philippines. Compagno, 1988: 324. No Philippine specimens. Last & Stevens, 1994: 237, fig, pl. 33. Distribution, questionable from Philippines. Compagno & Niem, 1998: 1332, fig. Western Central Pacific, including Philippines.

**Philippine material:** 4 whole, 1 pair dried jaws, Pasil Fish Port I, Cebu City; Palapala Fish Port, Cadiz City; Matahimik, Puerto Princesa City; Sagay Public Market, Sagay; JPAG 299, female, 933 mm TL, April 12, 2000; JPAG 317, female, 738 mm TL, April 10, 2000; BRU 186, female, 753 mm TL, April 10, 2000; BRU 110, female, 620 mm TL, March 12, 2000; BRU 077, unknown sex, unknown TL, April 15, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 317 (with umbilical scar) in photo catalogue agrees with description in Compagno (1984) and Compagno & Niem (1998) although first dorsal fin



is more raked (specimen is newly born). One set of jaws (BRU 077) from Sagay, Negros Occidental agrees with descriptions in cited references.

**?*Carcharhinus dussumieri* (Valenciennes, 1839). Whitecheek shark.**

*Carcharias* (*Prionodon*) *Dussumieri* Valenciennes, in Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 47, pl. 19 (teeth). Syntypes: Museum National d'Histoire Naturelle, Paris, MNHN-1135, 370 mm immature male, Pondicherry, India; MNHN-1136, 435 mm immature male, Bombay, India; Institut für Spezielle Zoologie und Zoologisches Museum, Berlin, ZMB(ISZZ)-4464, 492 mm TL female, China; and a fourth MNHN specimen from Bombay that is apparently lost. Lectotype: MNHN-1135, designated by Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 59).

**References:** ?*Carcharias dussumieri*: Herre, 1953: 17. Large (ca. 3 m) specimens under this name from Manila Bay, Sulu Sea, which are certainly not this species; also records from Dumaguete, Cebu Market and other parts which may include *C. sealei*. ?*Carcharias menisorrhah*: Herre, 1953: 20. Possibly referring to this species as well as *C. sealei* and possibly *C. falciformis*, from Cebu and Manila Bay. *Carcharhinus dussumieri*: Roxas & Martin, 1937: 13. Philippines. Garrick, 1982: 54, figs. 28–32. No Philippine specimens, but specimens are recorded from adjacent areas in the South China Sea. Compagno, 1984: 469, fig. Possible from Philippines. Compagno, 1988: 324. No Philippine specimens. Last & Stevens, 1994: 239, fig. pl. 36. Distribution, including Philippines. Compagno & Niem, 1998:1334, fig. Western Central Pacific, including Philippines.

**Philippine material:** None.

**Remarks:** See discussion under *Carcharhinus sealei*. This small and common Indo–West Pacific species has been recorded from adjacent places to the Philippines including Borneo, the Gulf of Thailand, Viet-Nam and China. It and *C. sealei* are readily mistaken for each other.

***Carcharhinus falciformis* (Bibron, 1839). Silky shark.**

*Carcharias* (*Prionodon*) *falciformis* Bibron, in Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 47. Holotype: Museum National d'Histoire Naturelle, Paris, MNHN-1134, 528 mm TL female embryo, Cuba, according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 164).

*Aprionodon sitankaiensis* Herre, 1934, Field Mus. Nat. Hist., Zool. Ser. 21: 11. Holotype: Division of Systematic Biology, Stanford University, SU-13601, 528 mm TL female fetus, Sitanki, Sibutu Islands, Sulu Archipelago, Philippine Islands.

**References:** *Aprionodon sitankaiensis*: Roxas & Martin, 1937: 14. Philippines. Fowler, 1941: 143. Philippines. Herre, 1953: 16. Sitankai, Sibutu Is., Sulu Archipelago. *Carcharhinus falciformis*: Garrick, 1982: 159, figs. 73–74. SU-13601 examined but no other Philippine specimens. Compagno, 1984: 470, fig. Distribution, Philippines. Compagno, 1988: 324. Philippines. Last & Stevens, 1994: 241, fig. pl. 35. Distribution, including Philippines. Compagno & Niem, 1998: 1335, fig. Western Central Pacific, including Philippines.

**Philippine material:** Manila specimen in Marine Science Institute, University of Philippines, Manila market, 19–30 September, 1995, juvenile female with faint umbilical scar, 770 mm TL, 560 mm PCL, examined by L. Compagno. 3 whole, 1 without internal organs, 5 pairs dried jaws, Dumaguete City Public Market; Barra, Puntod, Lopez Jaena; Bacong; Pasil Fish Market I, Cebu City; Osucan, Plaridel; San Jose, Taytay; Dipolog City Fish Port; MMLM 022, female, 768 mm TL; BRU 070, female, 1,065 mm TL, April 10, 1999; JPAG 009, unknown sex, unknown TL, January 25, 1999; JPAG 133, female, 739 mm TL, April 21, 1999; JPAG 185, unknown sex, unknown TL, April 6, 1999; JPAG 186, unknown sex, unknown TL, April 6, 1999; JPAG 187, unknown sex, unknown TL, April 6, 1999; BRU 052, immature male, 805 mm TL, April 7, 1999; JPAG 198, unknown sex, unknown TL, July 2, 1999. SU-13601, holotype of *Aprionodon sitankaiensis* examined by L. Compagno.

**Remarks:** Collected during WWF elasmobranch biodiversity project. A female with umbilical scar in the photo catalogue (JPAG 0133), a preserved head (RSE 001) from Siquijor, and four sets of jaws (JPAG 009, JPAG 0187, JPAG 0185 and JPAG 0186) from Bacong, Negros Oriental, all agree with descriptions in cited references.

***Carcharhinus hemiodon* (Valenciennes, 1839). Pondicherry shark.**

*Carcharias (Hypoprion) hemiodon* Valenciennes, in Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 35, pl. 19 (teeth). Holotype: Museum National d'Histoire Naturelle, MNHN-1040, 467 mm immature male, Pondicherry, India, according to Garrick (1985, NOAA Tech. Rep., Nat. Mar. Fish. Serv. (34): 17).

**References:** *Carcharias hemiodon*: Gogorza y Gonzales, 1888: 393. Bahia de Manila. Palacky, 1891: 230. Philippines. Casto de Elera, 1895: 613. Manila Bay. *Carcharias (Hypoprion) hemiodon*: Meyer, 1885: 48. Bahia de Manila (Luzon). *Hypoprion hemiodon*: Roxas & Martin, 1937: 13. Philippines. Fowler, 1941: 146. Cites records by Meyer and Casto de Elera for Philippines but no additional material. Herre, 1953: 23. Motorship *Spencer F. Baird*, Malampaya Sound, Palawan, Oct. 1947. *Carcharhinus hemiodon*: Compagno, 1984: 475. Indo-West Pacific, not recorded from Philippines. Garrick, 1985:13, fig. 9–10. No Philippine material, nominal records from Fowler. Compagno, 1988: 322. Philippines, nominal. Compagno & Niem, 1998: 1338, fig. Western Central Pacific, including Philippines.

**Philippine material:** Photos, Cebu Fish Port I, Pasil, Cebu City, JPAG 282, female, unknown TL, April 7, 2000.

**Remarks:** A female shark (JPAG 282) photographed at Pasil, Cebu, during the WWF elasmobranch biodiversity project may possibly be this species. However, without information on its teeth and an image of its dorsal profile (to determine the presence/absence of an interdorsal ridge) its identification remains uncertain. Its body shape stouter than *C. limbatus* (more similar to *C. amblyrhynchoides*) but its eye seems larger. A comparatively rare species known from few specimens and records.

***Carcharhinus leucas* (Valenciennes, 1839). Bull shark.**

*Carcharias (Prionodon) leucas* Valenciennes, in Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 42. Syntypes: Four stuffed specimens in Museum National d'Histoire Naturelle, Paris, of which two are extant according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 82): MNHN-A9650, 1600 mm TL adult male, and MNHN-A9652, 1860+ mm female with broken tail, both from the Antilles.

**References:** ?*Carcharhinus gangeticus*: Roxas & Martin, 1937: 11. Philippines. ?*Carcharias gangeticus*: Herre, 1953: 18. Herre may have been mostly referring to *C. leucas* rather than *Glyphis gangeticus* or possibly other *Glyphis* species when he noted: "Enters rivers and is a permanent resident in some Philippine lakes". Herre gives records from Manila Bay; Cebu; Agusan River at Monkayo, and Saug River, Davao Province, Mindanao; Parang, Jolo Island and Sitankai, Sulu Province; Lake Naujan, Mindoro. *Carcharhinus leucas*: Bigelow & Schroeder, 1948: 337, figs. 60–61, also 378, fig. 70 as *C. nicaraguensis*. General, review of literature. Garrick, 1982: 81, figs. 40–41. No Philippine specimens. Compagno 1984: 478, fig. Philippines. Compagno, 1988: 325. No Philippine specimens. Last & Stevens, 1994: 244, fig. pl. 34. Distribution, including Philippines. Compagno & Niem, 1998: 1339, fig. Western Central Pacific, including Philippines.

**Philippine material:** Photos, 1 pair dried jaws, 1 pair claspers, Pasil Fish Port I and II and Suba, Pasil, Cebu City; Bukana, Sikayab, Dapitan City, JPAG 283, male, unknown TL, April 8, 2000; JPAG 183, unknown sex, unknown TL, April 16, 1999; JPAG 189, mature male, unknown TL, May 18, 1999.

**Remarks:** Two records obtained from Pasil, Cebu and Dapitan City, Zamobanga del Norte during WWF elasmobranch biodiversity project. JPAG 280, mature male, and JPAG 283 in photo catalogue agree with description in although origin of first dorsal fin more posterior (about over pectoral free tips). A set of jaws (JPAG 0183) from Dapitan City, Zamobanga del Norte agrees with descriptions in cited references.

***Carcharhinus limbatus* (Valenciennes, 1839). Blacktip shark.**

*Carcharias (Prionodon) limbatus* Valenciennes, in Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 49, pl. 19 (teeth). Syntypes: Two specimens in the Museum National d'Histoire Naturelle, Paris, of which MNHN-3468, a 720 mm TL male (mounted skin) from Martinique, is extant according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.[445]: 31). The second syntype, about 843 mm TL, was apparently lost.

**References:** *Eulamia limbata*: Fowler, 1941: 150. No Philippine records. *Carcharias limbatus*: Herre, 1953: 18. Specimen caught by Kauffman off motorship *Theodore N. Gill* in April 1948 off reef near Pilas Island, off Basilan, Sulu Sea. *Carcharhinus limbatus*: Bigelow & Schroeder, 1948: 346, figs. 62–63. General, review of literature. Garrick, 1982: 28, figs. 16–18. USNM-170487, ca. 1030 mm TL female, South Tumindao Island, Philippines, collected by RV *Albatross* on Feb. 26, 1908. Compagno, 1984: 481. Distribution, Philippines.

Compagno, 1988: 325. No Philippine specimens. Last & Stevens, 1994: 246, fig. pl. 33. Distribution, including Philippines. Compagno & Niem, 1998: 1340, fig. Western Central Pacific, including Philippines.

**Philippine material:** 5 whole, 1 head, 2 pairs dried jaws, Pasil Fish Port I and Fish Market, Cebu City; Banago, Palapala, Bacolod City; Osucan, Plaridel; Vito, Sagay, JPAG 298, immature male, 859 mm TL, April 10, 2000; BRU 032, female, 792 mm TL, February 18, 1999; BRU 033, immature male, 722 mm TL, February 18, 1999; JPAG 179, female, 799 mm TL, May 27, 1999; JPAG 180, immature male, 711 mm TL, May 27, 1999; JPAG 013, male, unknown TL, January 29, 1999; JPAG 182, unknown sex, unknown TL, April 6, 1999; BRU 095, male, unknown TL, April 17, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 0180, female with umbilical scar, in photo catalogue agree with descriptions in cited references, although first dorsal fin more falcate (but specimen is newly born) and tips of pelvic fins not clearly black-tipped in photograph. Four sets of jaws (BRU 095, JPAG 182, JPAG 197, JPAG 198) from Sagay, Negros Occidental; Plaridel, Misamis Occidental and Taytay, Palawan agree with descriptions in cited references.

***Carcharhinus longimanus* (Poey, 1861). Oceanic whitetip shark.**

*Squalus longimanus* Poey, 1861, Mem. hist. nat. Cuba: 338, pl. 19, fig. 9–10. Holotype? 1640 mm TL male, Cuba (extant?) according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 154). Garrick (*ibid.*, 151) used this species rather than its senior synonym *S.(C.) maou* Lesson, 1830 because *S. longimanus* was placed on the Official List of Specific Names in Zoology (Name no. 2059) by the International Commission on Zoological Nomenclature, Opinion 723 (1965, Bull. Zool. Nomencl. 22: 32).

**References:** *Carcharias commersoni*: Herre, 1953: 17. Records from Manila Bay; Sibuyan Island; and Sitankai, Sulu Province may or may not be this species. *Carcharhinus longimanus*: Bigelow & Schroeder, 1948: 354, figs. 64–65. General, review of literature. Garrick, 1982: 150, figs. 69–71. Zoologisches Staatinstitut und Zoologisches Museum, Hamburg, ZSZM–14620, 425 mm TL male fetus, Mindanao, Philippine Islands, collected by J. Horn, June 4, 1912. Compagno, 1984: 484, fig. Assumed to occur off Philippines. Compagno, 1988: 325. No Philippine records. Last & Stevens, 1994: 247, fig. pl. 31. Distribution, including Philippines. Compagno & Niem, 1998: 1341, fig. Western Central Pacific, including Philippines.

**Philippine material:** None examined.

**Remarks:** Reasonably commonly landed at fish markets in nearby countries. Presence in Philippine waters confirmed by Garrick's (1982) record but its absence or apparent rarity from Philippine markets is surprising.

**?*Carcharhinus macloti* (Müller & Henle, 1839). Hardnose shark.**

*Carcharias (Hypoprion) macloti* Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 34, pl. 10. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH, dried specimen from New Guinea.

**References:** *Hypoprion macloti*: Fowler, 1941: 145. No Philippine material or records. *Carcharhinus macloti*: Compagno, 1984: 486, fig. Questionable from Philippines. Garrick, 1985: 17, figs. 11–12. U.S. National Museum USNM–197385, 734 mm TL male, collected from Manila Fish Market but said to have been caught by fishermen from off Borneo, North Sulu Sea, in March, 1962. Garrick also noted that Casto de Elera (1895) had reported this species from the Philippines. Compagno, 1988: 322. No Philippine specimens. Last & Stevens, 1994: 271, fig. pl. 37. Distribution, questionable from Philippines. Compagno & Niem, 1998: 1342, fig. Western Central Pacific, possible in Philippines, but no specimens.

**Philippine material:** None examined by the WWF elasmobranch biodiversity project.

**Remarks:** Herre (1953) did not mention this species in his checklist. This species is recorded from adjacent areas in the South China Sea and is likely to occur in the Philippines, but the old record by Casto de Elera (1895) needs to be confirmed. Garrick's specimen from the Manila Fish Market could have been caught more locally than off Borneo, but this could not be confirmed by a search on the USNM fish database (USNM URL 2002) which gave the locality of USNM–197385 as Indonesian Borneo, North Sulu Sea, while noting the purchase of the specimen from the Manila Fish Market by Victor G. Springer between March 20 and 31, 1962.

***Carcharhinus melanopterus* (Quoy & Gaimard, 1824). Blacktip reef shark.**

*Carcharias melanopterus* Quoy & Gaimard, 1824, Zoologie, Poissons, in L. de Freycinet, Voyage aut. monde corv. S.M. *l'Uranie* et *La Physicienne*, 1817–1820: 194, pl. 43, figs. 1–2. Holotype: Museum National d'Histoire Naturelle, Paris, MNHN–1129, ca. 590 mm TL male, Vaigiou (Waigeu) Is., New Guinea, according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 102).

**References:** *Carcharias melanopterus*: Herre, 1953: 19. Manila Bay; Cabalian, Leyte: Cebu market; Zamboanga market, Zamboanga Province, Mindanao; Jolo, Siasi, and Sitankai, Sulu Province *Carcharhinus melanopterus*: Roxas & Martin, 1937: 11. Philippines. Garrick, 1982: 96, figs. 43–44. U.S. National Museum, USNM–151229, 505 and 525 mm TL females, and Museo Civico di Storia Naturale, Genoa, MSNG C.E. 38453, 510 mm TL female, Leyte, Abuyog, Philippines, collected by RV *Albatross*. Compagno, 1984: 487, fig. Distribution, including Philippines. Compagno, 1988: 326. Philippine specimens. Last & Stevens, 1994: 250, fig, pl. 32. Distribution, including Philippines. Compagno & Niem, 1998: 1343, fig. Western Central Pacific, including Philippines.

**Philippine material:** Stanford University, SU–14423, 493 mm TL immature female and two immature males, 517–700 mm TL, Jolo Is., Sulu Archipelago, Philippine islands. 3 whole, 1 without dorsal, pectoral and lower lobe of caudal fin, photos, Satellite Market, Bais City; Pasil Fish Port I and Market, Cebu City, JPAG 213a, immature male, 482 mm TL, April 29, 1999; JPAG 127, male, 731 mm TL, April 22, 1999; JPAG 128, immature male, 742 mm TL, April 22, 1999; JPAG 357, female, 755 mm TL, May 12, 2000; JPAG 125a, immature male, 952 mm TL, April 22, 1999; JPAG 119, female, 1,451 mm TL, April 20, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 0127 in photo catalogue and set of jaws (JPAG 198) agrees with description in cited references.

### ***Carcharhinus sealei* (Pietschmann, 1913). Blackspot shark.**

*Carcharias sealei* Pietschmann, 1913, Jahrb. Nassau Ver. Nat. Wiesbaden. 86: 172, footnote. Replacement name for *Charcharias borneensis* Seale, 1910, and hence taking the same type specimen.

*Charcharias borneensis* Seale, 1910, Philippine J. Sci., Ser. D, 5: 263, pl. 1, fig. 1–4. Holotype: Bureau of Science, Manila, Philippine Islands, no 2720, from Sandakan, Borneo, apparently destroyed by fire during World War II according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.[445]: 49). Junior homonym of *Carcharias (Prionodon) borneensis* Bleeker, 1859 = *Carcharhinus borneensis*.

**References:** *Carcharias menisorrah*: Herre, 1953: 17, 20. *Carcharhinus menisorrah*: Roxas & Martin, 1937: 11. Philippines. Records of *C. menisorrah* and *C. dussumieri* may refer to this species, from Cebu and Manila Bay. *Carcharhinus sealei*: Garrick, 1982: SU–27561, Cebu; US National Museum of Natural History, USNM–151233, 680 mm TL female, Cebu market. Compagno, 1984: 497, fig. Distribution, including Philippines. Compagno, 1988: 327. Philippine specimen. Compagno & Niem, 1998: 1346, fig. Western Central Pacific, including Philippines.

**Philippine material:** Stanford University, SU–27561, 365 mm TL immature female, Cebu, Philippines. Manila specimens in MRI or CSIRO from Navotas Market, 5 Oct. 1995, 383 mm TL, 274 mm PCL newborn female, open umbilical scar, examined by L. Compagno. 2 whole, 4 with fins missing, Puerto Princesa Public Market, JPAG 223, female, 463 mm TL, March 12, 2000; JPAG 220, immature male, 528 mm TL, March 12, 2000; JPAG 221, female, 469 mm TL, March 12, 2000; JPAG 214, immature male, 548 mm TL, March 14, 2000; JPAG 215, female, 556 mm TL, March 14, 2000; BRU 122, immature male, 449 mm TL, March 15, 2000.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 215, female and JPAG 214, immature male, agree with illustrations in cited references by having the first dorsal fin raked and falcate, not upright and triangular. Mouth width is 6.4% of TL also agreeing with *C. sealei*. However, the pectoral fin length is 1.6 in anterior margin length which falls in the range for *C. dussumieri*. Vertebral counts are required to fully resolve its identification.

### ***Carcharhinus sorrah* (Valenciennes, 1839). Spot-tail shark.**

*Carcharias (Prionodon) sorrah* Valenciennes, in Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 45, pl. 16. Syntypes: Five, Rijksmuseum van Natuurlijke Historie, Leiden, RMNH–4294, 570 mm female, Java; Museum National d’Histoire Naturelle, Paris, MNHN–1131, 544 mm TL female, Pondicherry, India and MNHN–1132, 935 mm TL male from Madagascar (= *C. falciformis*); and two in the Museum of the Zoological Society of London that are possibly lost according to Garrick (1982, Nat. Ocean. Atmosph. Adm. USA, Tech. Rep., Nat. Mar. Fish. Serv. Circ.(445): 168). Garrick (*loc. cit.*) designated RMNH–4294 as lectotype because it had been illustrated in the original description (Valenciennes, in Müller & Henle, 1839, *loc. cit.*, pl. 16).

**References:** *Eulamia sorrah*: Fowler, 1941: 156. San Roque market, Cavite Province, Luzon. *Carcharias sorrah*: Herre, 1953: 20. No additional material. *Carcharhinus sorrah*: Garrick, 1982: 165, figs. 75–77. US National Museum, USNM–170558, 738 mm TL female, San Roque Market, Philippines, collected by RV *Albatross*, Dec. 1, 1908; USNM–170488, 1160 mm TL female, La Monja Island, Manila Bay, RV *Albatross*,

Feb. 7, 1909. Compagno, 1984: 500, fig. Distribution, including Philippines. Compagno, 1988: 327. No Philippines specimens. Last & Stevens, 1994: 271, fig. pl. 37. Distribution, including Philippines. Compagno & Niem, 1998: 1347, fig. Western Central Pacific, including Philippines.

**Philippine material:** 2 heads, 6 whole, Palapala, Cadiz City; New Sagay and Sagay Public Market; Pasil Fish Market and Suba, Pasil, Cebu City, BRU 093, female, unknown TL, April 17, 1999; BRU 094, female, 515 mm TL, April 17, 1999; BRU 103, immature male, 523 mm TL, April 18, 1999; JPAG 123, immature male, 949 mm TL, April 20, 1999; JPAG 126, immature male, 952 mm TL, April 20, 1999; JPAG 166, female, 527 mm TL, April 22, 1999; JPAG 165, female, 518 mm TL, April 22, 1999; BRU 076, unknown sex, unknown TL, April 15, 1999; JPAG 039, unknown sex, unknown TL, February 21, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 0126, male, in photo catalogue agrees with descriptions in Compagno (1984) and Compagno & Niem (1998) although first dorsal fin is more raked. A head, BRU 076, agrees with descriptions in cited references.

### **Genus *Galeocerdo* Müller & Henle, 1837. Tiger sharks.**

Genus *Galeocerdo* Müller & Henle, 1837, Ber. K. preuss. Akad. wiss. Berlin, 2: 115; Müller & Henle, 1837, Arch. Naturg. 3: 398. Type species: *Squalus arcticus* Faber, 1839, by subsequent monotypy in Bonaparte, 1838, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 211.

### ***Galeocerdo cuvier* (Peron & Lesueur, 1822). Tiger shark.**

*Squalus cuvier* Peron & Lesueur, in Lesueur, 1822, J. Acad. Nat. Sci. Philadelphia 2: 351. Holotype: None. Type locality: Northwest coast of New Holland (Australia).

**References:** *Galeocerdo arcticus*: Kauffman, 1950: 1–10. Biology of Philippine tiger sharks. Herre, 1953: 21. Malampaya Sound, Palawan (227 kg spec. caught by Alvin Seale); between Dumaguete, Oriental Negros Province and Siquijor Is. (4 m female with 25 fetuses, one in Silliman U. collection); Sulu Sea on reefs near Pilas Island, west of Basilan Island (abundant, a 490 kg specimen had 53 fetuses, caught by Kauffman on motorship *Theodore N. Gill* in April 1948. *Galeocerdo cuvier*: Bigelow & Schroeder, 1948: 266, fig. 44. General data, review of literature. Compagno, 1984: 503, fig. Distribution, including Philippines. Compagno, 1988: 283. No Philippine material. Randall, 1992: 21–31. General biology, distribution including Western Central Pacific. Last & Stevens, 1994: 258, fig. pl. 29. Distribution, including Philippines. Compagno & Niem, 1998: 1349, fig. Western Central Pacific, including Philippines.

**Philippine material:** 1 pair dried jaws, Osucan, Plaridel, JPAG 176, unknown sex, April 6, 1999.

**Remarks:** A set of jaws (JPAG 176) from Plaridel, Misamis Occidental collected during WWF elasmobranch biodiversity project agrees with descriptions in cited references.

### **?Genus *Glyphis* Agassiz, 1843. River sharks.**

Genus *Glyphis* Agassiz, 1843, Recher. Poiss. Foss. 3: 243. Type species: *Carcharias (Prionodon) glyphis* Müller & Henle, 1839, Syst. Besch. Plagiost. pt. 2: 40, by absolute tautonymy.

### **?*Glyphis* sp. River shark.**

**References:** ?*Eulamia gangetica*: Fowler, 1941: 168. Philippine freshwater records from Herre. ?*Carcharhinus gangeticus*: Herre, 1927: 303. Lake Naujan, Mindoro. Roxas & Martin, 1937: 12. Philippines. ?*Carcharias gangeticus*: Herre, 1953: 18. Records from Manila Bay; Cebu; Agusan River at Monkayo, and Saug River, Davao Province, Mindanao; Parang, Jolo Island and Sitankai, Sulu Province; Lake Naujan, Mindoro. *Glyphis gangeticus*: Compagno, 1984: 507, fig. Doubtful from Philippines. Compagno, 1988: 333. Discussion of distribution, doubtful from Philippines.

**Philippine material:** None.

**Remarks:** Nominal records of *Glyphis gangeticus* from the Philippines cannot be confirmed; these may be based in whole or in part on *Carcharhinus leucas*. In the Western Pacific three species of *Glyphis* (but not *G. gangeticus*) are known from Papua-New Guinea, northern Australia, and Sabah, Borneo and may be wider-ranging (Compagno & Niem, 1998). River sharks (genus *Glyphis*) apparently favour the lower reaches and deltas of large muddy tropical rivers in the Indo–West Pacific.

**Genus *Loxodon* Müller & Henle, 1838. Sliteye sharks.**

Genus *Loxodon* Müller & Henle, 1838, Mag. Nat. Hist., n. ser., 2: 36; Müller & Henle, 1838, Arch. Naturg. 4: 84; Müller & Henle in Bonaparte, 1838, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 211 (no species mentioned); Müller & Henle, 1839, Syst. Besch. Plagiost., pt. 2: 61. Type species: *Loxodon macrorhinus* Müller & Henle, 1839, by monotypy.

***Loxodon macrorhinus* Müller & Henle, 1838. Sliteye shark.**

*Loxodon macrorhinus* Müller & Henle, 1839, Syst. Besch. Plagiost., pt. 2: 61, pl. 25. Holotype, Zoologisches Museum, Humboldt Universität, Berlin, ISZZ 4479, 315 mm fetus. Type locality unknown.

**References:** *Scoliodon dumerili*: Roxas & Martin, 1937: 13. Philippines. Fowler, 1941: 132. Philippines, Dumaguete. Herre, 1953: 23. Manila Bay, Luzon; Dumaguete, Oriental Negros Province; also caught in Malampaya Sound, Palawan in October 1947 by the motorship *Spencer F. Baird*. *Loxodon macrorhinus*: Fowler, 1941: 181. No Philippine records. Springer, 1964: 588, fig. 4. Specimens from Manila area, Limbones Cove, Luzon Point, and Dumaguete. Compagno, 1984: 514, fig. Distribution, including Philippines, although map does not indicate Philippine records. Compagno, 1988: 294. Philippine specimens. Last & Stevens, 1994: 260, fig. pl. 30. Distribution, no Philippine records. Compagno & Niem, 1998: 1351, fig. Western Central Pacific, including Philippines.

**Philippine material:** Stanford University, SU-13670, 489 mm TL immature male; SU-26819, 400 mm TL immature male; SU-26821, 367 mm TL late fetal male; SU-26819, 400 mm TL immature male; SU-26821, 367 mm TL late fetal male; all from Dumaguete, Negros Island, Philippines. 4 whole, Pasil Fish Port I, Cebu City; Malabuhan, Siaton; Palapala fish port, Cadiz City, JPAG 284, mature male, 865 mm TL, April 7, 2000; BRU 008, female, 592 mm TL, January 26, 1999; BRU 085a, mature male, 660 mm TL, April 16, 1999; BRU 087, mature male, 840 mm TL, April 16, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 284, mature male in photo catalogue agrees with descriptions in cited references, although apex of first dorsal fin is more acute.

**Genus *Negaprion* Whitley, 1940. Lemon sharks.**

Genus *Negaprion* Whitley, 1940, Fish. Australia (1): 111. Type species: *Aprionodon acutidens queenslandicus* Whitley, 1939, equals *Negaprion queenslandicus* Whitley, 1940, by original designation; probably junior synonym of *Carcharias acutidens* Rüppell, 1837.

***Negaprion acutidens* (Rüppell, 1837). Sharptooth lemon shark.**

*Carcharias acutidens* Rüppell, 1837, Neue Wirbelth. Fauna Abyssinien gehör., Fische rothen Meeres (1835–1838): 65, pl. 18, fig. 3. Lectotype; Naturmuseums Senckenberg, SMF 2825, 68 cm stuffed specimen, designated by Klausewitz (1960, Senckenbergiana Biol. 41: 292). Type locality, Djedda, Saudi Arabia, Red Sea.

**References:** *Aprionodon acutidens*: Fowler, 1941: 141. No Philippine records. Herre, 1953: 16. 790 mm TL specimen taken by motorship *Spencer F. Baird*, Oct. 1947, in Turung Bay, Malampaya Sound, Palawan. *Negaprion acutidens*: Compagno, 1984: 517, fig. Distribution, Philippines after Herre, but not indicated on map. Compagno, 1988: 345. Distribution, no material or records from Philippines. Last & Stevens, 1994: 262, fig. pl. 31. Distribution, no Philippine records. Compagno & Niem, 1998: 1352, fig. Western Central Pacific, not indicated from the Philippines.

**Philippine material:** None examined by the WWF elasmobranch biodiversity project.

**Remarks:** The disposition of Herre's specimen is unknown, and was not encountered by L. Compagno in the Stanford fish collection. This large shark is wide-ranging in the Indo–West Pacific and is likely to be found on coral reefs in the Philippines.

**Genus *Prionace* Cantor, 1849. Blue sharks.**

Subgenus *Prionace* Cantor, 1849 (Genus *Carcharias* Cuvier, 1816), J. Asiatic Soc. Bengal, 18(2): 1399. Type species: *Squalus glaucus* Linnaeus, 1758 under suspension of the Rules by the International Commission on Zoological Nomenclature, Opinion 723 (1965, Bull. Zool. Nomencl. 22: 32).

***Prionace glauca* (Linnaeus, 1758). Blue shark.**

*Squalus glaucus* Linnaeus, 1758, Syst. Nat., ed. 10, 1: 235. Holotype, unknown, type locality: “Habitat in Oceano Europaeo.”

**References:** *Carcharias glaucus?*: Gogorza y Gonzales, 1888: 393. Paranas (Samar). *Glyphis glaucus*: Fowler, 1941: 178. No Philippines records. *Prionace glauca*: Bigelow & Schroeder, 1948: 282, figs. 47–48. General data, review of literature. Compagno, 1984: 521, fig. General range, mapped for Philippine seas. Compagno, 1988: 350. No Philippine specimens, Last & Stevens, 1994: 263, fig. pl. 29. Distribution, including Philippines. Compagno & Niem, 1998: 1353, fig. Western Central Pacific, mapped around Philippines.

**Philippine material:** 7 whole, Bagong Sikat, Liberty, Puerto Princesa City, JPAG 210, female, 474 mm TL, March 13, 2000; JPAG 211, female, 476 mm TL, March 13, 2000; JPAG 212, immature male, 474 mm TL, March 13, 2000; BRU 117, female, 470 mm TL, March 13, 2000; BRU 118, female, 462 mm TL, March 13, 2000; BRU 119, immature male, 468 mm TL, March 13, 2000; BRU 120, immature male, 490 mm TL, March 13, 2000.

**Remarks:** Collected during WWF elasmobranch biodiversity project. BRU 117, a newly born female in the photo catalogue, agrees with description in cited references. Herre (1953) did not include this species in his checklist of Philippine fishes.

**Genus *Rhizoprionodon* Whitley, 1929. Sharpnose sharks.**

Genus *Rhizoprionodon* Whitley, 1929, Aust. Zool. 5: 354. Type species: *Carcharias (Scoliodon) crenidens* Klunzinger, 1879 by original designation and as a replacement name for *Rhizoprion* Ogilby, 1915.

**Remarks:** The grey sharpnose shark, *Rhizoprionodon oligolinx* Springer, 1964, is not presently known from the Philippines but occurs nearby in the South China Sea (Springer, 1964, Compagno & Niem, 1998). It has been widely confused with *Rhizoprionodon acutus* but differs in being smaller, stockier, and having very short upper labial furrows.

***Rhizoprionodon acutus* (Rüppell, 1835). Milk shark.**

*Carcharias acutus* Rüppell, 1837, Neue Wirbelth. Fauna Abyssinien gehör., Fische rothen Meeres (1835–1838): 65, pl. 18, fig. 4. Lectotype: Natur-Museum und Forschungs-Institut Senckenberg, Frankfurt-am-Main, Germany, SMF 2783.

**References:** *Scoliodon palasorrah*: Herre, 1953: 24. Cavite, Cavite Province, Luzon; Dumaguete; common in Manila and Cebu mkts.; Tacloban, Leyte; Iloilo mkt, Iloilo Province, Panay; Dapitan, Zamboanga Province, Mindanao; Jolo market, Sulu Province; also cites Fowler’s (1941) records from Limbones Cove, Cavite Province, Langaog Point, Sorsogon Province, Luzon, and San Miguel Bay, Luzon. *Scoliodon intermedius*: Roxas & Martin, 1937: 13. Philippines. Herre, 1953: 24. Collected by motorship *Spencer F. Baird*, Oct. 1947, in Malampaya Sound, Turung Bay, Palawan. *Scoliodon walbeehmi*: Roxas & Martin, 1937: 13. Philippines. Herre, 1953: 25. Common in Philippine markets; Orion, Bataan Province, Luzon; Manila; Dumaguete. ?*Carcharias acutus*: Casto de Elera, 1895: 613–621. Philippines. ?*Scoliodon acutus*: Roxas & Martin, 1937: 13. Philippines. *Rhizoprionodon acutus*: Springer, 1964: 594, fig. 5–6. Numerous specimens from Sitankai; south Tumindao Lagoon; Mindanao; Panay, Iloilo; Capiz; Unisan, Tayabas; Cavite, Luzon; Orion, Bataan Province; Manila and Manila Bay; La Monja Island. Compagno, 1984: 525, fig. Distribution, including Philippines. Compagno, 1988: 299. Philippine specimens. Last & Stevens, 1994: 265, fig. pl. 30. Distribution, including Philippines. Compagno & Niem, 1998: 1354, fig. Western Central Pacific, including Philippines.

**Philippine material:** Stanford University, SU–13725, 685 mm TL female, Sitankai (Si Tangkay) Island; SU–13152, 729 mm TL adult male, Mindanao; GVF–A–13, six immature males, 325, 357, 363, 368, 374, 400 mm TL, Cadiz, Negros; SU–14454, 400 mm TL immature male, Iloilo, Panay; SU–26862, 285 mm TL immature male, Capiz, Panay; SU–26820, 309 mm TL immature male, Unisan, Tayabas Province, Luzon; SU–9639, 275 mm TL immature male, 345 mm TL immature female, Cavite, Luzon; SU–20592, two immature females, 283–289 mm TL, 295 mm TL immature male; SU–26818, two immature males, 284–396 mm TL and 350 mm TL immature female; SU–29621, three immature males, 283, 290, 308 mm TL, 258 mm TL immature female; George Vanderbilt Foundation, GVF–2873, two immature males, 280–285 mm TL; GVF–uncat., 808 mm TL pregnant female; all from vicinity of Manila, Luzon. 1 whole, Puerto Princesa City Public Market, JPAG 217, immature male, 354 mm TL, March 14, 2000.

**Remarks:** It is uncertain if Herre (1953) was referring to *Rhizoprionodon acutus* or also to *R. oligolinx* in his records of *Scoliodon intermedius* and *S. walbeehmi*. Collected during the WWF elasmobranch biodiversity

project. JPAG 217, a young male with an umbilical scar, from the photo catalogue agrees with descriptions in cited references.

**?Genus *Scoliodon* Müller & Henle, 1837. Spadenose sharks.**

Genus *Scoliodon* Müller & Henle, 1837, Ber. K. preuss. Akad. wiss. Berlin, 2: 114; Müller & Henle, 1837, Arch. Naturg. 3: 397; Müller & Henle, 1838, Mag. Nat. Hist., n. ser., 2: 35; Müller & Henle, 1838, L'Institut, 6: 64; Müller & Henle, 1838, Arch. Naturg. 4: 84. No species mentioned. Müller & Henle, 1838, Syst. Besch. Plagiost., pt. 1: 27. Type species: *Scoliodon laticaudus* Müller & Henle, 1838 by monotypy.

**?*Scoliodon laticaudus* Müller & Henle, 1838. Spadenose shark.**

*Scoliodon laticaudus* Müller & Henle, 1838, Syst. Besch. Plagiost., pt. 1: 27. Holotype: A single specimen, Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität, Berlin, ZMB 7830, a 420 mm stuffed specimen, was mentioned in Müller & Henle's initial account of this species (loc. cit.), making it the presumptive holotype; however, additional specimens preserved in alcohol in the Museum National d'Histoire Naturelle, Paris, were mentioned in their emended description of the species (Müller & Henle, 1839, Syst. Besch. Plagiost., pt. 2: 28, pl. 8). Springer (1964, Proc. U.S. Natn. Mus. 115: 580) designated one of these Paris specimens, MNHN 1123, 518 mm TL adult female, as a lectotype. Type locality, "Aus Indien".

**References:** *Carcharias laticaudus*: Casto de Elera, 1895: 613 to 621. Philippines. *Scoliodon laticaudus*: Springer, 1964: 580–583. No Philippine records. Compagno, 1984: 534, fig. Distribution, no Philippines records. Compagno, 1988: 289. Distribution, no Philippines material. Compagno & Niem, 1998: 1357, fig. Western Central Pacific, not indicated for Philippines.

**Philippine material:** None extant.

**Remarks:** Fowler (1941) and Herre (1953) did not have Philippine references of this species as such, but their work precedes resolution of the confused systematics and nomenclature of *Loxodon*, *Scoliodon* and *Rhizoprionodon* by Springer (1964). No material was collected during WWF elasmobranch biodiversity project. Casto de Elera's early record cannot be verified, and it is possible that the record could be based on a species of *Loxodon* or *Rhizoprionodon*. It is not known if this common inshore Indo–West Pacific shark occurs in the Philippines, but it is found in adjacent areas of the South China Sea including the Gulf of Thailand, the southern coast of China and Sarawak (Malaysian Borneo). However, based on information from Borneo, *Scoliodon* appears to prefer coastal areas of reduced salinity such as those in the vicinity of large river estuaries. Such habitats are largely absent from the Philippines.

**Genus *Triaenodon* Müller & Henle, 1837. Whitetip reef sharks.**

Genus *Triaenodon* Müller & Henle, 1837, Ber. K. preuss. Akad. wiss. Berlin, 2: 117; Müller & Henle, 1837, Arch. Naturg. 3: 396; Müller & Henle, 1838, Mag. Nat. Hist., n. ser., 2: 36; Müller & Henle, 1838, L'Institut, 6: 64; Müller & Henle, 1838, Arch. Naturg. 4: 84 (no species named); Müller & Henle, in Bonaparte, 1838, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 212. Type species: *Triaenodon obesus* Müller & Henle, 1838 by monotypy (name only), a junior synonym of *Carcharias obesus* Rüppell, 1837. Gill (1862, Ann. Lyceum Nat. Hist. New York, 7(32): 401) designated *Triaenodon obesus* Müller & Henle (1839) as type species of *Triaenodon*, which also equals *Carcharias obesus* Rüppell.

***Triaenodon obesus* (Rüppell, 1837). Whitetip reef shark.**

*Carcharias obesus* Rüppell, 1837, Neue Wirbelth. Fauna Abyssinien gehör., Fische rothen Meeres (1835–1838): 64, pl. 18, fig. 2. Lectotype, Naturmuseums Senckenberg, SMF 3149, 31 cm stuffed specimen, designated by Klausewitz (1960, Senckenbergiana Biol. 41: 291). Type locality, Djedda, Saudi Arabia, Red Sea.

**References:** *Triaenodon obesus*: Gogorza y Gonzales, 1885: 74. Manila. Gogorza y Gonzales, 1888: 74. Bahia de Manila. Casto de Elera, 1895: 615 (cited from Fowler, 1941). Manila Bay. Fowler, 1941: 194. Philippine records but no specimens. Herre, 1953: 26. Specimens collected from Manila Bay and Sitankai, Sulu Province. Randall, 1977: 147. Summary of distribution, Philippines. Compagno, 1984: 536, fig. Distribution including Philippines. Compagno, 1988: 356. Distribution, no Philippines material. Last & Stevens, 1994: 26, fig. pl. 31. Distribution, including Philippines. Compagno & Niem, 1998: 1358, fig. Western Central Pacific, including Philippines.



**Philippine material:** 1 whole, 2 heads, 1 pair dried jaws, New Sagay, Sagay; Pasil Fish Market, Cebu, BRU 078, unknown sex, unknown TL, April 16, 1999; BRU 079, unknown sex, unknown TL, April 16, 1999; BRU 104, unknown sex, unknown TL, April 18, 1999; JPAG 137, female, 985 mm TL, April 21, 1999; BRU 080, unknown sex, unknown TL, April 16, 1999. A search on the USNM fish database (USNM URL 2004) revealed two Philippine specimens, USNM-151226, from Cebu market, and USNM-151227, from Caxicagan Island, both collected by RV *Albatross*.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 137, a female in the photo catalogue, agrees with descriptions in cited references, except that second dorsal and lower caudal fin lacks white tips. A set of jaws (BRU 104) from New Sagay, Negros Occidental also agrees with published descriptions.

### **Family Sphyrnidae Gill, 1872. Hammerhead sharks.**

Family Sphyrnidae Gill, 1872, *Smiths. Misc. Coll.* (247): 24 Type genus: *Sphyrna* Rafinesque, 1809.

#### **Genus *Eusphyra* Gill, 1862. Winghead sharks.**

Genus *Eusphyra* Gill, 1862, *Ann. Lyceum Nat. Hist. New York*, 7(32): 403. Type species: *Eusphyra Blochii* Gill, 1862, by original designation, equals *Zygaena nobis blochii* Cuvier, 1816 and *Zygaena blochii* Valenciennes, 1822.

#### ***Eusphyra blochii* (Cuvier, 1816). Winghead shark.**

(*z. nobis Blochii*) Cuvier, 1816, *Reg. Anim.*, ed. 1, 2: 127, ftn. 3. Holotype, none? Cuvier's cryptic and parenthetical naming and abbreviated description of his apparently new species is generally considered as equivalent to *Zygaena blochii* Cuvier, 1816. Fowler (1941, *Bull. U.S. Natn. Mus.*, (100) 13: 221) noted that Cuvier's species was based on the *Squalus zygaena* of Bloch (1785, *naturg. ausl. Fische*, 1, pl. 117) from India as indicated by Cuvier's description.

**References:** *Sphyrna blochii*: Herre, 1930: 142. Turtle Islands, Sulu Sea. Roxas & Martin, 1937: 14. Philippines. Fowler, 1941: 221. Philippine records, no specimens. Herre, 1953: 26. "Common in markets of the Sulu Islands". Specimens collected from Sitankai, Sulu Province. Gilbert, 1967: 20, fig. 5, 21a, 22a, pls. 1, 5. Distribution, no Philippine specimens. *Eusphyra blochii*: Compagno, 1984: 540, fig. Distribution, including Philippines. Compagno, 1988: 372, pl. 11a. Philippines, no specimens examined. Last & Stevens, 1994: 271, fig, pl. 37. Distribution, including Philippines. Compagno & Niem, 1998: 1363, fig. Western Central Pacific, including Philippines.

**Philippine material:** None examined from Philippines, although material was examined by L. Compagno from Thailand, Singapore, and Borneo in the South China Sea.

**Remarks:** A small and unmistakable hammerhead, apparently once common according to Herre, who deposited specimens of *Eusphyra blochii* from Sabah, Borneo, in the Stanford fish collection. *Eusphyra blochii* was not collected during the WWF elasmobranch biodiversity project and may have been affected adversely by recent local fishing practices (including use of light gillnets, which would be ideal for snagging the long narrow blades of the head of this species).

#### **Genus *Sphyrna* Rafinesque, 1810. Hammerhead sharks.**

Genus *Sphyrna* Rafinesque, 1810, *Caratt. gen. sp. anim. piant. Sicilia, Palermo*, pt. 1: 46, 60. Type species: *Squalus zygaena* Linnaeus, 1758, by subsequent designation of Jordan & Gilbert, 1883, *Bull. U.S. Nat. Mus.* 16: 26.

**Uncertain identity:** *Sphyrna* sp., photo of head wing, Suba, Pasil, Cebu City JPAG 333, unknown sex, unknown TL, April 13, 2000.

**Remarks:** Awal, Codosan, Binkungan, Balagbagan, Krosan, and Ros (Herre, 1953), are Philippine names for *Sphyrna zygaena* and presumably apply to other species of *Sphyrna*.

***Sphyrna lewini* (Griffith & Smith, 1834). Scalloped Hammerhead.**

*Zygaena lewini* Griffith & Smith, in Cuvier, Griffith & Smith, 1834, Animal kingdom, 1: 640, pl. 60. Holotype: unknown. Type locality: South coast of New Holland (Australia).

**References:** *Sphyrna zygaena*: Fowler, 1941: 217 in part. Fowler mentioned Philippine specimens of “*Sphyrna zygaena*” collected by the RV. *Albatross* from Iloilo, Jolo and Manila markets in the U.S. National Museum of Natural History collections. *Sphyrna diplana*: Bigelow & Schroeder, 1948: 416, figs. 12A, 81. General, review of literature. *Sphyrna lewini*: Fowler, 1941: 215. No Philippine records. Gilbert, 1967: 37, figs. 10, 21d, 22d, pls. 3, 6b, 9b, 10b. Reidentification of the USNM Philippine specimens from Iloilo, Manila, and Cavite cited by Fowler as this species; according to Gilbert and the USNM fish database (USNM URL 2002), these specimens are USNM-56337 (Cavite), USNM-170554 (Iloilo), USNM-170555 (Manila), USNM-170556 (Manila), and USNM-170557 (Jolo). Compagno, 1984: 545, fig. Distribution including Philippines. Compagno, 1988: 356. Philippine material examined. Last & Stevens, 1994: 272, fig. pl. 37. Distribution, including Philippines. Compagno & Niem, 1998: 1364, fig. Distribution in Western Central Pacific, including Philippines.

**Philippine material:** George Vanderbilt Foundation, GVF-uncat., 492 mm TL immature female, Manila Bay, Luzon, Philippines. 9 whole, 2 pairs dried jaws, Osucan, Plaridel; Palapala Fish Port, Cadiz City; Palapala Fish Port, Bacolod City; Pasil Fish Market I, Cebu City, JPAG 177, unknown sex, unknown TL, April 6, 1999; BRU 089, male, 899 mm TL, April 16, 1999; BRU 090, immature male, 898 mm TL, April 16, 1999; BRU 091, female, 946 mm TL, April 16, 1999; BRU 092, female, 830 mm TL, April 16, 1999; BRU 100, immature male, 583 mm TL, April 18, 1999; BRU 101, immature male, 583 mm TL, April 18, 1999; JPAG 042, female, 470 mm TL, March 21, 1999; JPAG 124, female, 1,121 mm TL, April 22, 1999; JPAG 125, female, 1,192 mm TL, April 22, 1999; JPAG 174, unknown sex, April 6, 1999.

**Remarks:** Herre’s (1953) records of nominal *Sphyrna zygaena* probably includes records of this species, which generally is the most common, large hammerhead in tropical seas. These two species were often mistaken for each other and for *S. mokarran* in the past. JPAG 0124, a female in the WWF photo catalogue, agrees with descriptions in cited references.

***Sphyrna mokarran* (Rüppell, 1837). Great hammerhead.**

*Zygaena mokarran* Rüppell, 1837, Neue Wirbelth. Fauna Abyssinien gehör., Fische rothen Meeres (1835–1838): 66, pl. 17, fig. 3. Lectotype: Naturmuseums Senckenberg, Frankfurt, SMB-3590, 2515 mm TL stuffed adult or adolescent male, Massaua, Red Sea, according to Klauswitz (1960, Senckenbergiana Biol. 41: 293).

**References:** *Sphyrna tudes*: Herre, 1930: 144. Philippines, probably *S. mokarran* on head shape. Roxas & Martin, 1937: 14. Philippines. Bigelow & Schroeder, 1948: 428, figs. 83–84. General, review of literature. Herre, 1953: 28. Manila Bay; Cebu, Cebu Province; Zamboanga, Zamboanga Province, Mindanao. Gilbert, 1967: 25, fig. 6–7, 21b, 22b, pls. 2, 6a. No Philippine records or specimens. Compagno, 1984: 548, fig. No Philippine records. Compagno, 1988: 356. No Philippine material. Last & Stevens, 1994: 274, fig. pl. 37. Distribution, no records from Philippines. Compagno & Niem, 1998: 1365, fig. Distribution in Western Central Pacific, not indicated from Philippines.

**Philippines material:** None, but specimens examined from the Gulf of Thailand.

**Remarks:** No specimens discovered by WWF elasmobranch biodiversity project. *Sphyrna mokarran* is sometimes mistaken for *S. lewini*, and is generally much less common than that species. The conservation status of this shark is of great concern because its large fins, including the tall, sail-like first dorsal fin, are prized in the Oriental sharkfin trade.

***Sphyrna zygaena* (Linnaeus, 1758). Smooth hammerhead.**

*Squalus zygaena* Linnaeus, 1758, Syst. Nat., ed. 10, 1: 234. Holotype unknown, type locality: “Habitat in Europa, America.”

**References:** ?*Zygaena malleus*: Meyer, 1885: 48. Bahia de Manila (Luzon). Palacky, 1891: 230. Philippines. Casto de Elera, 1895: 613–621. Philippines. ?*Sphyrna zygaena*: Roxas & Martin, 1937: 14. Philippines. Herre, 1953: 28. Taytay, Palawan (U. of Philippines collection, 12’ specimen); straits of Balabac (A. Seale, up to 15’); Zamboanga market, Zamboanga Province, Mindanao; Sitankai, Sulu Province; museums of Santo Tomas U. and the Ateneo de Manila; also cites records from Dumaguete; from San Miguel Bay, Luzon; from Cagayan Province, Luzon; from Iloilo market, Iloilo Province, Panay; and from Jolo Market, Sulu Province. Bigelow & Schroeder, 1948: 436, figs. 85–86. General, review of literature. Gilbert, 1967: 31, figs. 8–9, 21c, 22c, pl. 6c. No Philippine specimens or records. Compagno, 1984: 553, fig. No Philippine records. Compagno, 1988: 369. No Philippine specimens or records. Last & Stevens, 1994: 275, fig. pl. 37. Distribution, no Philippine records.

Compagno & Niem, 1998: 1366, fig. Distribution in the Western Central Pacific, marginal in the area but possibly more widely distributed, no Philippine records.

**Philippine material:** 1 pair dried jaws, Osucan, Plaridel, JPAG 184, unknown sex, unknown TL, April 6, 1999.

**Remarks:** There are far fewer validated records of *Sphyrna zygaena* from the tropics than of *S. lewini*, in part due to confusion of the two species with each other and with *S. mokarran*. Herre's (1953) records of nominal *S. zygaena* from the Philippines may include more than one species, probably *S. lewini* and possibly *S. mokarran* in addition to *S. zygaena*, but is more likely to be based mainly on *S. lewini*. A set of jaws JPAG 184 collected during the WWF elasmobranch biodiversity project from Plaridel, Misamis Occidental is apparently *S. zygaena*. Tooth shape more broadly triangular and cusps lower than in *S. lewini*; not serrated as in *S. mokarran* (see cited references).

### ?*Sphyrna tiburo* (Linnaeus, 1758). Bonnethead shark.

*Squalus tiburo* Linnaeus, 1758, Syst. Nat., ed. 10, 1: 234. Holotype unknown, type locality: "Habitat in America."

**References:** *Zygaena tiburo*: Casto de Elera, 1895: 615. Navotas, Manila Bay, Luzon. *Sphyrna tiburo*: Fowler, 1941: 212. Citation of Casto de Elera's record, but no specimens. Herre, 1953: 27. Recorded in 1936–1937 collections from Zamboanga market, Zamboanga Province, Mindanao. Gilbert, 1967: 47. No Eastern Hemisphere records. Compagno, 1984: 550, fig. Western Hemisphere distribution, no mention of Philippines or China records. Compagno, 1988: 369. No Eastern Hemisphere specimens.

**Philippine material:** None.

**Remarks:** It is not possible to check the veracity of Casto de Elera's (1895) record of this species from Manila (as cited by Fowler, 1941). Apparently Philippine specimens attributed to this species by Herre (1953) were not deposited in the Stanford University fish collections (Gilbert, 1967, Compagno, 1968) and presumably were destroyed if retained in the Philippines. "Despite statements to the contrary..., there appear to be no substantiated records of *Sphyrna tiburo* outside of the Western Hemisphere" (Gilbert, 1967). It is likely that Casto de Elera's and Herre's records of *S. tiburo* was based on a vaguely similar hammerhead such as the young of *S. mokarran*.

## Superorder Squalomorphii Compagno, 1973. Squalomorph sharks and batoids.

Superorder Squalomorphii Compagno, 1973c, J.Linn.Soc.(Zool.), 53, suppl. 1: 26.

### Order Hexanchiformes Garman, 1913. Cow and frilled sharks.

Order Plagiostoma, Suborder Antacea, "Group" Hexanchoidei: Garman, 1913 (in part), Mem. Mus. Comp. Zool. Harvard 36: 10, 11.

### Family Hexanchidae Gray, 1851. Sixgill and sevengill sharks.

Tribe Hexanchina Gray, 1851 (Family Squalidae), List Fish British Mus., Pt. 1, Chondropterygii, British Mus. (Nat. Hist.): 67. Type genus: *Hexanchus* Rafinesque, 1810.

#### Genus *Heptranchias* Rafinesque, 1810. Sharpnose sevengill sharks.

Genus *Heptranchias* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 13. Type species, "*Squalus cinereus* Lacépède" by original designation, equals *S. cinereus* Gmelin, in Linnaeus & Gmelin, 1788 and a junior synonym of *Squalus perlo* Bonnaterre, 1788.

#### *Heptranchias perlo* (Bonnaterre, 1788). Sharpnose sevengill shark.

*Squalus perlo* Bonnaterre, 1788, Tabl. encyclop. method. trois reg. Nat., Ichthyol., Paris: 10. Holotype unknown. Type locality: "La Méditerranée", = Mediterranean Sea.

**References:** *Heptranchias perlo*: Fowler, 1941: 9. No Philippine material or records. Bigelow & Schroeder, 1948: 88, figs. 10–11. General data, review of literature. Compagno, 1984: 17, fig. Distribution, no Philippine

records. Ebert, 1990: 70. No Philippine records. Last & Stevens, 1994: 39, fig. pl. 1. Distribution, no Philippine records. Compagno & Niem, 1998: 1210, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 11 whole, Dipolog City Public Market; Bukana, Sikayab, Dapitan City; Punta Miray, Baliangao, BRU 154, female, 670 mm TL, March 30, 2000; BRU 148, mature male, 744 mm TL, March 30, 2000; BRU 149, mature male, 664 mm TL, March 30, 2000; BRU 150, female, 660 mm TL, March 30, 2000; BRU 151, female, 699 mm TL, March 30, 2000; JPAG 274, mature male, 702 mm TL, March 30, 2000; BRU 152, mature male, 670 mm TL, March 30, 2000; BRU 153, immature male, 634 mm TL, March 30, 2000; BRU 056, immature male, 455 mm TL, April 10, 1999; JPAG 113, female, 638 mm TL, April 17, 1999; JPAG 117a 99 mm TL, April 15, 1999; JPAG 086, mature male, 943 mm TL, April 12, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 086, a 943 mm TL mature male, in the photo catalogue agrees with descriptions in cited references.

### **Genus *Hexanchus* Rafinesque, 1810. Sixgill sharks.**

Genus *Hexanchus* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 14. Type species, "*Squalus griseus* Lacépède", by original designation, equals *Squalus griseus* Bonnaterre, 1788.

#### ***Hexanchus griseus* (Bonnaterre, 1788). Bluntnose sixgill shark.**

*Squalus griseus* Bonnaterre, 1788, Tabl. encyclop. method. trois reg. Nat., Ichthyol., Paris: 9. Types unknown according to Boeseman in Hureau & Monod (1973, CLOFNAM. Check-list. fish. NE Atlantic Mediterranean, 1: 9). Type locality: "La Méditerranée" = Mediterranean Sea.

**References:** *Hexanchus griseus*: Fowler, 1941: 11. No Philippine records or specimens. Bigelow & Schroeder, 1948: 80, fig. 8, 9B. General data, review of literature. Herre, 1953: 7. Specimens from Dumaguete and Manila Bay in Silliman University, apparently lost. Springer & Waller, 1979: 169–173. No Philippine records. Compagno, 1984: 19, fig. Distribution, no Philippine records. Ebert, 1990: 71. Philippines. Last & Stevens, 1994: 40, fig. pl. 1. Distribution, possible Philippine records. Compagno & Niem, 1998: 1210, fig. Western Central Pacific, including the Philippines.

**Philippine material:** 2 pairs dried jaws, Bukana, Sikayab, Dapitan City; Pamilacan Island, Baclayon, JPAG 175, unknown sex, unknown TL, April 16, 1999; SUML 001, unknown sex, unknown TL.

**Remarks:** Herre's (1953) records of *Hexanchus griseus* were misidentifications in part of *Hexanchus nakamurai*. Two Dumaguete specimens of *H. nakamura* were deposited at Stanford University (SU-30642) by Herre as *H. griseus*. Also collected during WWF elasmobranch biodiversity project. Two sets of jaws, JPAG 0175 and SUML 001 agree with description in cited references.

#### ***Hexanchus nakamurai* Teng, 1962. Bigeye sixgill shark.**

*Hexanchus griseus nakamurai* Teng, 1962, Class. Dist. Chond. Taiwan: 30, fig. 5. Holotype: Taiwan Fisheries Research Institute, TFRI 2515, 750 mm TL male, probably juvenile, Keelung, Taiwan. Possibly lost according to Ebert (1990, Taxon., biogeog. biol. cow and frilled sharks (Chondrichthyes: Hexanchiformes), Ph.D. thesis, Rhodes U. Grahamstown, South Africa: 55.), who searched for it during a visit to Taiwan.

*Hexanchus vitulus* Springer & Waller, 1969, Bull. Mar. Sci. 19(1): 160, figs. 1, 2A, 3–4. Holotype: U.S. National Museum of Natural History, USNM 200674, 148 cm TL adult male, off Bimini, Bahamas, in about 350 m depth, confirmed by Howe & Springer (1993, Smiths. Contr. Zool. [540]: 14).

**References:** *Hexanchus griseus*: Herre, 1953: 7. In part, specimens from Dumaguete, deposited at Stanford University. *Hexanchus vitulus*: Springer & Waller, 1969: 160. Possible record based on Stanford University, SU-30642, specimens from Dumaguete. Compagno, 1984: 20, fig. Distribution, Philippines. *Hexanchus nakamurai*: Ebert, 1990: 73. Philippines. Last & Stevens, 1994: 41, fig. pl. 1. Distribution, including Philippines. Compagno & Niem, 1998: 1210, fig. Western Central Pacific, including Philippines.

**Philippine material:** Stanford University, SU-30642, 450 mm TL term fetal male, 440 mm TL fetal female, from Dumaguete, collected by A.W.C.T. Herre and examined by L. Compagno. 3 whole, Dipolog City Public Market; Isla Verde, Pulu, Dapitan City, JPAG 053, immature male, 1,074 mm TL, April 7, 1999; JPAG 067a, immature male, 722 mm TL, April 8, 1999; JPAG 067b, female, 718 mm TL, April 8, 1999.

**Remarks:** Collected during WWF elasmobranch biodiversity project. JPAG 0127 in the photo catalogue agrees with descriptions in cited references.

## Order Squaliformes Gill, 1862. Dogfishes.

Order Squali, Suborder Squali Gill, 1862 (in part), Ann. Lyc. Nat. Hist. N. Y. 7: 367, 394, 396.

### Family Echinorhinidae Gill, 1862. Bramble sharks.

Family Echinorhinoidae Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 406. Type genus: *Echinorhinus* Blainville, 1816. Emended to Family Echinorhinidae by Gill, 1893, Natn. Acad. Sci. USA, Mem. 6, 6: 129.

#### Genus *Echinorhinus* Blainville, 1816. Bramble sharks.

Subgenus *Echinorhinus* Blainville, 1816, Bull. Sci. Soc. Philomat. Paris, (8): 121 (genus *Squalus* Linnaeus, 1758). Type species: “*Spinus*” = *Squalus spinosus* Gmelin, in Linnaeus & Gmelin, 1788, by monotypy.

#### ?*Echinorhinus cookei* Pietschmann, 1928. Prickly shark.

*Echinorhinus cookei* Pietschmann, 1928, Anz. Akad. Wiss. Wien, 27: 297; also separately described by Pietschmann, 1930, Bull. Bernice P. Bishop Mus. (73): 3, fig. 1, pl. 1. Holotype: Bernice P. Bishop Museum, 2033 mm TL adult male, from deep water along south coast of Kauai Island, Hawaiian Islands, disintegrated according to Eschmeyer (1998, Catalog of Fishes, CD-ROM). Neotype: National Museum of New Zealand, NMNZ P.2774, 1980 mm TL adult (or adolescent?) male, Cook Strait, designated by Garrick, 1960, Trans. R. Soc. New Zealand 88(1): 110.

**References:** *Echinorhinus cookei*: Garrick, 1960: 110, figs. 1–3. Distribution, no Philippines records. Compagno, 1984: 27, fig. Distribution, including Taiwan and Belau (Palau), near Philippines. Last & Stevens, 1994: 46, fig, pl. 11. Distribution, southern Philippines on map. Compagno & Niem, 1998: 1212. Western Central Pacific, including southern Philippine Islands on map.

**Philippine material:** None?

**Remarks:** Uncertain if this species occurs off the Philippines, but quite likely due to its presence in closely adjacent areas.

### Family Squalidae Blainville, 1816. Spiny dogfishes.

Genus or family *Squalus* Blainville, 1816, Bull. Sci. Soc. Philomat. Paris, (8): 121. Type genus: *Squalus* Linnaeus, 1758.

#### Genus *Squalus* Linnaeus, 1758. Spurdogs.

Genus *Squalus* Linnaeus, 1758, Syst. Nat., ed. 10, 1: 233. Type species: *Squalus acanthias* Linnaeus, 1758, by subsequent designation of Gill, 1862, Ann. Lyceum Nat. Hist. New York, 7(32): 405.

#### *Squalus cf. megalops* Macleay, 1881. Philippine shortnose spurdog.

?*Acanthias megalops* Macleay, 1881a, Proc. Linn. Soc. New South Wales, 1882 (published Feb. 23, 1881), 6(2): 367, also Macleay, 1881b, Descr. Cat. Australian Fish. 2: 303. Type specimens not mentioned, type locality “Port Jackson” [= Sydney Harbour, Australia]. Holotype: Australian Museum, Sydney, AMS I.16255–001.

**References:** Compagno, 1984: 118, fig. Distribution, no Philippine records. Last & Stevens, 1994: 99, fig, pl. 5. Distribution, no Philippine records. Compagno & Niem, 1998: 1230, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 19 whole, 1 with 1st dorsal spine broken, Bukana, Sikayab, Dapitan City; Malabuhan, Siaton; Punta Miray, Baliangao; Silliman Beach, Dumaguete City, JPAG 095, immature male, 331 mm TL, April 17, 1999; BRU 010, female, 482 mm TL, January 28, 1999; BRU 045, female, 500 mm TL, April 9, 1999; BRU 046, female, 444 mm TL, April 9, 1999; BRU 047, female, 473 mm TL, April 9, 1999; BRU 049, mature male, 370 mm TL, April 9, 1999; BRU 058, immature male, 355 mm TL, April 10, 1999; BRU 059, male, 340 mm TL, April 10, 1999; BRU 061, immature male, 358 mm TL, April 10, 1999; BRU 062, male, 357 mm TL, April 10, 1999; JPAG 089, immature male, 358 mm TL, April 17, 1999; JPAG 092, female, 472 mm

TL, April 17, 1999; JPAG 093, female, 447 mm TL, April 17, 1999; JPAG 099, immature male, 342 mm TL, April 17, 1999; JPAG 106, female, 479 mm TL, April 17, 1999; JPAG 110, immature male, 349 mm TL, April 17, 1999; MMLM 002 March 1, 1999; BRU 009, female, 483 mm TL, January 28, 1999; BRU 048, immature male, 365 mm TL, April 9, 1999; BRU 060, immature male, 347 mm TL, April 10, 1999; SUML 004, female, 499 mm TL, BRU 057, female, 454 mm TL, April 10, 1999.

**Remarks:** Similar to *Squalus megalops* from Australia but pale margins of the pectoral and caudal fins less evident. Matures at small size and has a brownish (rather than greyish) upper surface, characteristically angular free rear tip, unicuspidate denticles, 37–40 monospondylous centra, and minimal dark markings on the dorsal fins. A greyish specimen (JPAG 272) has darker apical markings on the dorsal fins, possibly a shorter post pelvic to caudal length, and more raked lower teeth than the other specimens. More material of this greyish form is needed.

***Squalus cf. mitsukurii* Jordan & Snyder, 1903. Philippine shortspine dogfish.**

?*Squalus mitsukurii* Jordan & Snyder, 1901, Annot. Zool. Japon. 3: 129. *Nomen nudum*. Jordan & Snyder, in Jordan & Fowler, 1903, Proc. U.S. Natn. Mus. 26 (1324): 629, not fig. 3. Holotype: Division of Systematic Biology, Stanford University (housed at California Academy of Sciences), SU-12793, 736 mm TL pregnant female (eviscerated), Misaki, Sagami Sea, Honshu, Japan, examined by L. Compagno.

*Squalus philippinus* Smith & Radcliffe, in Smith, 1912, Proc. U.S. Nat. Mus. 41(1877): 677, fig. 1, pl. 51. Holotype: United States National Museum of Natural History, USNM-70256, 320 mm TL immature male, RV *Albatross* Sta. 5111, off Sombrero Island, west coast of Luzon, Philippine Islands, 13°45'15"N, 120°46'30"E, in beam trawl at 432 m depth. A junior homonym of *Squalus philippinus* Shaw, 1804, = *Heterodontus portusjacksoni* (Meyer, 1793).

*Squalus montalbani* Whitley, 1931, Australian Zool 6: 320. Replacement name for *Squalus philippinus* Smith & Radcliffe, 1912 (not Shaw, 1804), hence assuming the same holotype, USNM-70256.

**References:** *Squalus fernandinus*: Roxas & Martin, 1937: 14. Philippines. Fowler, 1941: 260. Type of *Squalus philippinus*. Herre, 1953: 31. Extensive listing of non-Philippine references, notes on specimens from Dumaguete market and Fowler's record of the type of *S. philippinus*. *Squalus mitsukurii*: Compagno, 1984: 121, fig. Distribution, possibly Philippines. Last & Stevens, 1994: 101, fig. pl. 5. Distribution, including Philippines. Compagno & Niem, 1998: 1230, fig. Western Central Pacific, including Philippines.

**Philippine material:** Holotype of *Squalus philippinus*, examined by L. Compagno. Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-02-95, 19950923, 363–385 m, 13°08.98–09.84'N, 124°04.72–00.01'E, immature female, 381 mm TL, 303 mm PCL, at South African Museum.

**Remarks:** Possibly more than one Philippine species with neither conspecific with the Japanese dogfish, *Squalus mitsukurii*. These are high vertebral count forms with 43 monospondylous vertebrae, greyish bodies with pronounced apical markings on the dorsal fins, short post-pelvic to caudal fin lengths, moderately elongate second dorsal-fin spines half covered with skin, narrowly rounded pectoral-fin free rear tips, and very long, slender free rear tips on both dorsal fins. The caudal-fin forks are dark and similar to that of *S. mitsukurii*.

***Squalus* sp. 1. Philippine fatspine dogfish.**

**Philippine material:** 3 whole, Pasil, Polo and Bukana, Sikayab, Dapitan City, BRU 131, female, 715 mm TL, March 25, 2000; BRU 136, female, 533 mm TL, March 25, 2000; JPAG 272, immature male, 360 mm TL, March 29, 2000.

**Remarks:** Belongs to an unresolved group of relatively short-snouted dogfishes with tricuspidate denticles and thick dorsal-fin spines. It has a high rounded first dorsal fin, a particularly robust second dorsal-fin spine, small second dorsal fin with an angular apex and deeply notched posterior margin, and no black marking at the fork of the caudal fin. More specimens are needed to determine its identity.

***Squalus* sp. 2. Philippine longnose spurdog.**

**References:** *Squalus* sp. F (in part): Compagno & Niem, 1998: 1232. For Philippines records only. ?*Squalus mitsukurii*: Zhu & Meng, 2001: 320, fig. 167. China.

**Philippine material:** Bolinao Market, near Bolinao, Luzon in less than 40 m, afternoon market, October 7, 1995, six specimens: female, 551 mm TL, 446 PCL (#2); adult male, 494 mm TL, 403 mm PCL (#3); female, 486 mm TL, 390 mm PCL (#4); adult male, 479 mm TL, 385 mm PCL (#5); adult male, 533 mm TL, 426 mm PCL (#6); female, 595 mm TL, 478 mm PCL (#7). Bolinao Market, near Bolinao in less than 40 m, morning

market, October 7, 1995, adult male, 491 mm TL (#1). Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-02-95, 19950923, 363–385 m, 13°08.98–09.84'N, 124°04.72–00.01'E, immature female, 381 mm TL, 303 mm PCL; FR1-PHI-04-95, 19950924, 40–50 m, 12°49.19–47.23'N, 124°22.78–24.69'E, “4 Legaspi”, female, 456 mm TL, 365 mm PCL. Bolinao and TFRSI specimens at South African Museum and CSIRO Hobart. 45 whole, Bukana, Sikayab; Catulaya, San Juan, Siquijor; Pasil Fish Port I, Cebu City; Dipolog City Public Market; Isla Verde, Pulu and Pasil, Polo, Dapitan City; Malabuhan, Siaton; Punta Miray, Baliangao; Silliman Beach, Dumaguete City, JPAG 085b, mature male, 432 mm TL, April 17, 1999; JPAG 143, female, 557 mm TL, April 17, 1999; JPAG 151, mature male, 468 mm TL, April 17, 1999; JPAG 259, female, 530 mm TL, March 29, 2000; JPAG 260, mature male, 471 mm TL, March 29, 2000; JPAG 261, male, 488 mm TL, March 29, 2000; JPAG 262, mature male, 465 mm TL, March 29, 2000; JPAG 263, mature male, 465 mm TL, March 29, 2000; JPAG 264, female, 540 mm TL, March 29, 2000; JPAG 265, female, 544 mm TL, March 29, 2000; JPAG 266, female, 580 mm TL, March 29, 2000; JPAG 267, mature male, 473 mm TL, March 29, 2000; JPAG 268, mature male, 470 mm TL, March 29, 2000; RSE 002, female, 550 mm TL, March 3, 1999; JPAG 286, mature male, 411 mm TL, April 8, 2000; JPAG 287, mature male, 394 mm TL, April 8, 2000; JPAG 288, male, 405 mm TL, April 8, 2000; JPAG 289, mature male, 412 mm TL, April 8, 2000; JPAG 290, mature male, 422 mm TL, April 8, 2000; JPAG 291, mature male, 432 mm TL, April 8, 2000; JPAG 341, mature male, 406 mm TL, JPAG 342, mature male, 423 mm TL, JPAG 351, mature male, 394 mm TL, JPAG 065, male, 444 mm TL, April 8, 1999; JPAG 064, mature male, 458 mm TL, April 8, 1999; JPAG 150, immature male, 377 mm TL, April 7, 1999; BRU 012, female, 565 mm TL, January 29, 1999; BRU 054, female, 531 mm TL, April 10, 1999; BRU 145, mature male, 462 mm TL, March 28, 2000; BRU 146, mature male, 474 mm TL, March 28, 2000; MMLM 006, female, 542 mm TL, March 1, 1999; MMLM 007, female, 520 mm TL, May 9, 1999; MMLM 006, female, 520 mm TL, March 1, 1999; MMLM 003, female, 539 mm TL, March 1, 1999; MMLM 004, female, 555 mm TL, April 1, 1999; MMLM 009, female, 537 mm TL, April 1, 1999; MMLM 019, female, 498 mm TL, August 17, 1999; BRU 137, mature male, 452 mm TL, March 25, 2000; BRU 138, mature male, 467 mm TL, March 25, 2000; BRU 139, mature male, 458 mm TL, March 25, 2000; JPAG 063, mature male, 463 mm TL, April 8, 1999; JPAG 358, mature male, 422 mm TL, April 7, 2000; SUML 005, mature male, 442 mm TL, January to April, 1999; BRU 053, mature male, 482 mm TL, April 10, 1999; JPAG 149, immature male, 367 mm TL, April 17, 1999; BRU 055, female, 590 mm TL, April 10, 1999.

**Remarks:** This common, small, long-nosed dogfish appears to be closely related to but not conspecific with the larger and more robust, long-snouted dogfish *Squalus japonicus* Ishikawa, 1908 from Japan and Taiwan, and the larger and broader-headed *Squalus rancureli* Fourmanoir, 1978 from New Caledonia, based on a comparison of specimens of all three species (P. Last and L. Compagno). It is possibly conspecific with dogfishes occurring in the East and South China Seas (Zhu & Meng, 2001), and off the west coast of Australia (*Squalus* sp. E, Last & Stevens, 1994). Philippine specimens differ from Australian *Squalus* sp. E in having a dark brownish upper surface (rather than greyish), an angular free rear tip of the pectoral fin (rather than more rounded), a narrower and less pointed snout tip, a characteristically pale lower caudal-fin lobe, and possibly a larger pectoral fin and slightly broader pelvic fin. Otherwise, vertebral counts, and denticle and clasper morphologies are similar.

### **Family Centrophoridae Bleeker, 1859. Gulper sharks.**

Family Centrophoroidei Bleeker, 1859, Act. Soc. Sci. Ind. Neerl. 4(3): xii. Type genus: *Centrophorus* Müller & Henle, 1837.

#### **Genus *Centrophorus* Müller & Henle, 1837. Gulper sharks.**

Genus *Centrophorus* Müller & Henle, 1837a, Ber. K. preuss. Akad. wiss. Berlin, 2: 115; Müller & Henle, 1837b, Arch. Naturg. 3: 398. Type species: *Squalus granulosus* Bloch & Schneider, 1801, by monotypy.

#### ***Centrophorus isodon* (Zhu, Meng, & Liu, 1981). Black gulper shark.**

*Pseudocentrophorus isodon* Zhu, Meng, & Liu, 1981, Act. Zootax. Sinica, 6(1): 100, fig. 1. Holotype: Nan Hai Fisheries Research Institute, 630 mm TL male (possibly adult or adolescent), Xisha (Paracel) Islands, South China Sea, exact locality not given.

**Reference:** *Centrophorus isodon*: Compagno & Niem, 1998: 1218, 1221, fig. 30. Possibly Philippines.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-12-95, 19950927, 760–770 m, 14°50.46–49.38'N, 123°17.30–22.33'E, adult male, 856 mm TL, 680 mm PCL, at South

African Museum. 3 whole, Liberty, Bagong Sikat, Puerto Princesa City, JPAG 224, female, 869 mm TL, March 16, 2000; JPAG 225, female, 893 mm TL, March 16, 2000; JPAG 227, immature male, 771 mm TL, March 16, 2000.

**Remarks:** This poorly known gulper shark is characterized by a dark body, very long snout and large dorsal fins. New record for the Philippines. Distribution in the Indo–West Pacific poorly known but apparently present off the Maldives as well as the Philippines and South China Sea near the Xisha Islands.

***Centrophorus lusitanicus* Bocage & Capello, 1864. Lowfin gulper shark.**

*Centrophorus lusitanicus* Bocage & Capello, 1864, Proc. Zool. Soc. London, 24: 260, fig. 1. Syntype: British Museum (Natural History), BMNH–1867.7.23.2, 75 cm TL immature male, examined by the writer; other type material in Museu Bocage, Lisbon, probably lost in fire; type locality off Portugal.

**References:** *Centrophorus lusitanicus*: Compagno, 1984: 39, fig. Distribution, no Philippine records but present off Taiwan. Munoz-Chapuli & Ramos, 1989: 68, fig. 1b, 3b, 4d, 5c, 6c. Distribution, morphology, no Philippine records. Compagno & Niem, 1998: 1219, 1221, fig. 32. No Philippine records, uncertain in Western Central Pacific.

**Philippine material:** 1 whole, Liberty, Bagong Sikat, Puerto Princesa City, JPAG 226, immature male, 737 mm TL, March 16, 2000.

**Remarks:** New record for the Philippines. Poorly known from the general area and needs to be compared with material from Taiwan, the western Indian Ocean (Mozambique), and the Eastern Atlantic. This distinctive species has an unusually elongate first dorsal fin. Few other males apparently exist in collections.

***Centrophorus cf. moluccensis* Bleeker, 1860. Philippine smallfin gulper shark.**

*Centrophorus moluccensis* Bleeker, 1860, Act. Soc. Sci. Indo-Neerl., 1860, 8: 3. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH–7415, 188 mm late fetus, Ambon, Indonesia.

**References:** *Centrophorus scalpratus*: Bass, D'Aubrey & Kistnasamy, 1976: 29. Systematics, distribution. *Centrophorus moluccensis*: Compagno, 1984: 40, fig. Distribution, no Philippine records. Last & Stevens, 1994: 57, fig. pl. 4. Distribution, questionable from Philippines. Compagno & Niem, 1998: 1223, fig. Western Central Pacific, including Philippines.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-14–95, 19950927, 435–451 m, 14°41.07–42.42'N, 123°24.12–21.42'E, adult male, 905 mm TL, 710 mm PCL, at South African Museum. 1 without internal organs, 1 with 2nd dorsal-fin spine broken, Apo Island, Dauin; Bukana, Sikayab, Dapitan City; Dipolog City Public Market, MMLM 024, unknown sex, 790 mm TL, August 8, 2000; JPAG 253, mature male, 778 mm TL, March 29, 2000; JPAG 090, male, 792 mm TL, April 17, 1999; JPAG 254, immature male, 793 mm TL, March 29, 2000; JPAG 255, male, 764 mm TL, March 29, 2000; JPAG 256, immature male, 813 mm TL, March 29, 2000; JPAG 257, female, 671 mm TL, March 29, 2000; JPAG 258, immature male, 694 mm TL, March 29, 2000; JPAG 088, female, 449 mm TL, April 17, 1999; JPAG 097, immature male, 392 mm TL, April 17, 1999; JPAG 060, mature male, 796 mm TL, April 8, 1999; JPAG 061, immature male, 733 mm TL, April 8, 1999; JPAG 243, mature male, 829 mm TL, March 25, 2000.

**Remarks:** This is the main *Centrophorus* species taken in local markets. The Philippine form is typical of the *moluccensis* group in having a characteristically small second dorsal fin. Appears to be distinct from other members of the sub-group in the Western Central Pacific by a combination of dorsal-fin pigmentation, a relatively long snout, pale base to the first dorsal-fin spine, a deeply notched posterior margin of the pectoral fin, broad-based fin spines, and a very slightly concave posterior margin of the second dorsal fin forming a very broad, elongate, free rear tip. It needs to be critically compared with members of the group from southern Africa, which may have lower intestinal valve counts (21–24, mean 22.1, N = 9, vs. 29 for FR1-PHI-14–95 from Philippines).

**?*Centrophorus squamosus* (Bonnaterre, 1788). Leafscale gulper shark.**

*Squalus squamosus* Bonnaterre, 1788, Tabl. Encyclop. Method. Trois Reg. Nat., Ichthyol., Paris: 12. Holotype: Museum National d'Histoire Naturelle, Paris, MNHN–A7829, head only, no locality.

**References:** *Centrophorus squamosus*: Compagno, 1984: 43, fig. Distribution, including Philippines. Last & Stevens, 1994: 58, fig. pl. 4. Distribution, including Philippines. Compagno & Niem, 1998: 1224, fig. Western Central Pacific, Philippines. *Centrophorus foliaceus*: Fowler, 1941: 235. Philippines. Bigelow & Schroeder, 1957: 83. Smith's 1912 record. *Lepidorhinus foliaceus*: Smith, 1912c: 679. 31 cm TL male specimen collected



between Leyte and Mindanao, Philippines, at depth of 1757 m, no further data. Roxas & Martin, 1937: 15. Philippines. Herre, 1953: 31. Smith's record.

**Philippine material:** None.

**Remarks:** Not taken by the WWF elasmobranch biodiversity project, probably due to limited deepwater sampling. Validity of species record uncertain. Data from the USNM fish database (USNM URL, 2002) suggests that Smith's specimen of "*Lepidorhinus foliaceus*" is USNM-99494, RV *Albatross* TT9193, D5495, from northwest of Mindanao, 09°06'30"N, 125°00'20"E, 1786 m. It is currently identified in the USNM registers as *Centrophorus acus* Garman, 1906 (possibly by S. Springer?) but was not examined by us. Dr. D. Ebert, while visiting the Smithsonian Institution in 2003 to examine skates (Rajidae), attempted to locate and identify the specimen at our request but was unable to find it. Both *C. acus* and *C. squamosus* are likely from the Philippines, as both have been taken in adjacent areas, including the South China Sea. We keep Smith's (1912c) identification until the specimen can be found and reexamined.

**Genus *Deania* Jordan & Snyder, 1902. Birdbeak dogfishes.**

Genus *Deania* Jordan & Snyder, 1902, Proc. U.S. Natn. Mus. 25(1279): 80. Type species: *Deania eglantina* Jordan & Snyder, 1902, by monotypy, a junior synonym of *Acanthidium calceum* Lowe, 1839.

**?*Deania* cf. *rostrata* Garman, 1906. Japanese birdbeak dogfish.**

?*Acanthidium rostratum* Garman, 1906, Bull. Mus. Comp. Zool. Harvard, 46(11): 206. Holotype: Museum of Comparative Zoology, Harvard, MCZ-1047-S, 86 cm (as 34") TL adult female, Yenoura, Suruga Gulf, Japan.

**References:** *Acanthidium rostratum*: Garman, 1913: 218, pl. 11, fig. 1-4. Description and illustration of holotype, Japan. *Deania eglantina*: Bigelow & Schroeder, 1957: 104. *A. rostratum* synonymized with *D. eglantina* Jordan & Snyder, 1902 from Japan. *Deania calcea*: Compagno, 1984: 65. *Acanthidium rostratum* synonymized with *Deania calcea*.

**Philippine material:** Liberty, Bagong Sikat, Puerto Princesa City, JPAG 228, female, 744 mm TL, March 16, 2000.

**Remarks:** Single record with provisional identification given above. *Deania rostrata* has been considered to be a synonym of *D. calcea*. Philippine specimen has a long, low first dorsal fin with a greatly extended free rear tip and a long-based second dorsal fin but seems to differ from *D. calcea* in the relative extent of the interdorsal space and the relative sizes of the dorsal fins. There appears to be a difference between recognized nominal species and the specimen in the primary portions of the snout. More material and additional comparisons are required to resolve this issue.

***Deania profundorum* (Smith & Radcliffe, 1912). Arrowhead dogfish.**

*Nasisqualus profundorum* Smith & Radcliffe, in Smith, 1912, Proc. U.S. Nat. Mus. 41(1877): 681, fig. 3, pl. 53. Holotype: United States National Museum of Natural History, USNM-70258, 430 mm TL adult male, *Albatross* Sta. 5491, between Leyte and Mindanao, Philippine Islands, 9°24'N, 125°12'E, in beam trawl fished on green mud and coral bottom at 1347 m depth.

**References:** *Nasisqualus profundorum*: Smith & Radcliffe, in Smith, 1912: 683. Additional USNM material cited by Smith and Radcliffe includes USNM-99493, from *Albatross* Sta. 5219, 19080423, 13°21'N, 122°19'E, between Marinduque and Luzon, 970 m; USNM-99491, *Albatross* Sta. 5495, 19090801, 09°07'N, 125°00'E, between Leyte and Mindanao, 1786 m; USNM-99495, *Albatross* Sta. 5511, 19090801, 08°15'N, 123°57'E, Camp Overton Light, Mindanao, 750 m; USNM-99492, *Albatross* 5527, 19090811, 09°23'N, 123°43'E, between Siquijor and Bohol, 717 m. *Acanthidium profundorum*: Roxas & Martin, 1937: 15. Philippines. *Deania profundorum*: Fowler, 1941: 241. Philippines, additional USNM material. Herre, 1953: 30. Smith & Radcliffe's records. Compagno, 1984: 67, fig. 63. Distribution, Philippines. Compagno & Niem, 1998: 1225, fig. Western Central Pacific, Philippines.

**Philippine material:** Holotype, USNM-70258, examined by L. Compagno, but additional specimens cited by Smith & Radcliffe were not examined by the WWF elasmobranch biodiversity project.

**Remarks:** Probably more wide-ranging in the South China Sea than suggested by limited records from the Philippines.

### Family Etmopteridae Fowler, 1934. Lantern sharks.

Subfamily Etmopterinae Fowler, 1934, Proc. Acad. Nat. Sci. Philadelphia, 85: 239 (Family Squalidae). Type genus: *Etmopterus* Rafinesque, 1810.

#### Genus *Centroscyllium* Müller & Henle, 1841. Combtooth dogfishes.

Genus *Centroscyllium* Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3, suppl.: 191. Type species: *Centroscyllium fabricii* Müller & Henle, 1841 (new combination) by monotypy, equals *Spinax fabricii* Reinhardt, 1825.

#### *Centroscyllium* cf. *kamoharai* Abe, 1966. Bareskin dogfish.

*Centroscyllium kamoharai* Abe, 1966, Japanese J. Ichthyol. 13(4/6): 190, figs. 1–8. Holotype: Zoological Institute, Faculty of Science, University of Tokyo, ZIUT-52310, 440 mm TL adult female, Suruga Bay, off Yaizu, Japan.

**References:** *Centroscyllium kamoharai*: Last & Stevens, 1994: 61, fig. pl. 9. Distribution, including Philippines. *Centroscyllium* cf. *kamoharai*: Compagno & Niem, 1998: 1221. Luzon, Philippines.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-05-95, 19950924, 1037–1100 m, 13°21.32–20.50'N, 124°12.26–16.50'E: adult male, 404 mm TL, 305 mm PCL; adult male, 454 mm TL, 344 mm PCL; male?, 374 mm TL, 286 mm PCL; female, 235 mm TL, 179 mm PCL, at CSIRO Hobart.

**Remarks:** Possibly distinct from the Japanese form. Multiple species from the Indo-Pacific have been identified as *Centroscyllium kamoharai*.

#### Genus *Etmopterus* Rafinesque, 1810. Lantern sharks.

Genus *Etmopterus* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 14. Type species: *Etmopterus aculeatus* Rafinesque, 1810, by monotypy, equals *Squalus spinax* Linnaeus, 1758.

#### *Etmopterus brachyurus* Smith & Radcliffe, 1912. Short-tail lanternshark.

*Etmopterus brachyurus* Smith & Radcliffe, in Smith, 1912, Proc. U.S. Nat. Mus. 41(1877): 679, fig. 2, pl. 52. Holotype: U.S. National Museum of Natural History, 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.

**References:** *Etmopterus brachyurus*: Roxas & Martin, 1937: 15. Philippines. Fowler, 1941: 248. Holotype. Herre, 1953: 30. Philippines. Compagno, 1984: 72, fig. Holotype examined, Distribution, Philippines. Yamakawa, Taniuchi & Nose, 1986: 197–207. Japan, Philippines. Last & Stevens, 1994: 79, fig. pl. 7. Distribution, including Philippines. Compagno & Niem, 1998: 1226, fig. Western Central Pacific, including Philippines.

**Philippine material:** Holotype, USNM-70257, examined by L. Compagno.

**Remarks:** Often confused with other, similar lanternsharks with linear denticles and long tails.

#### *Etmopterus lucifer* Jordan & Snyder, 1902. Blackbelly lanternshark.

*Etmopterus lucifer* Jordan & Snyder, 1902, Proc. U.S. Natn. Mus. 25(1279): 79, fig. 1. “This description from specimens from Misaki, measuring 12 inches, from the collection of Capt. Alan Owston, no. 6863, Stanford University Zoological Museum.” Specimen examined by L. Compagno and labeled holotype is Division of Systematic Biology, Stanford University, SU-6863, 282 mm TL adult male, off Misaki, east coast of Honshu, Japan. According to Howe & Springer (1993, Smiths. Contr. Zool. [540]: 9) this is properly a syntype, as there were other specimens originally catalogued as SU-6863 and the original description did not specify a type. U.S. National Museum of Natural History, USNM-50728, 282 mm TL male, was originally from this lot. SU-6863 was restricted to the above specimen and listed as a holotype by Böhlke (1953, Stanford Ichthyol. Bull. 5: 10), which effectively names it as a lectotype.

**References:** *Etmopterus lucifer*: Smith, 1912c: 679. Nominally from Philippine Islands, from *Albatross* dredging stations from 14 stations in 9 localities (not listed here), from Mindanao Sea off the north coast Mindanao; between Negros and Siquijor; from Balayan Bay, Luzon; Verde Island Passage between Luzon and Mindoro; off eastern Mindoro; near Malavatuan Island, between Lubang and Luzon; off W. coast of Jolo Island; and between Jolo and Tawi-Tawi. Depth range 311–582 m. Some of these specimens are apparently *E.*

*brachyurus*. Roxas & Martin, 1937: 15. Philippines. Fowler, 1941: 246. Philippines. Herre, 1953: 30. Philippines. Compagno, 1984: 79, fig. Distribution, Philippines, holotype examined. Yamakawa, Taniuchi & Nose, 1986: 197–207. Japan, Philippines. Last & Stevens, 1994: 81 fig, pl. 7. Distribution, including Philippines. Compagno & Niem, 1998: 1226, fig. Western Central Pacific, including Philippines.

**Philippine material:** None collected by the project. Material from Philippines examined by L. Compagno in USNM collection.

**Remarks:** Often confused with other, similar lanternsharks with linear denticles and a long tail.

## **Family Dalatiidae Gray, 1851. Kitefin sharks.**

Tribe Dalatiana Gray, 1851, List Fish British Mus., Pt. 1, Chondropterygii, British Mus. (Nat. Hist.): 74 (Family Squalidae). Type genus: *Dalatias* Rafinesque, 1810.

### **Genus *Isistius* Gill, 1865. Cookiecutter sharks.**

Genus *Isistius* Gill, 1865, Proc. Acad. Nat. Sci. Philadelphia: 264, fn. \*2. Type species: *Scymnus brasiliensis* “Müller & Henle, 1839”, by monotypy, equals *Scymnus brasiliensis* Quoy & Gaimard, 1824.

#### ***Isistius brasiliensis* (Cuvier, In Quoy & Gaimard, 1824). Cookiecutter shark.**

*Scymnus brasiliensis* Cuvier, in Quoy & Gaimard, 1824, Zoologie, Poissons, in L. de Freycinet, Voyage aut. monde corv. S.M. *l’Uranie* et *La Physicienne*, 1817–1820: 198. Holotype: Museum National d’Histoire Naturelle, Paris, MNHN–A.7787, 140 mm female, off Brazil.

**References:** *Isistius brasiliensis*: Fowler, 1941: 270, no Philippine records. Bigelow & Schroeder, 1948: 509, figs. 98–99. General data, review of literature. Compagno, 1984: 93, fig. Distribution, no Philippine records. Jahn & Haedrich, 1987: \*303, fig. 5 Specimens from south of Philippines. Last & Stevens, 1994: 86, fig, pl. 3. Distribution, including Philippines. Compagno & Niem, 1998: 1222, fig. Range in Western Central Pacific.

**Philippine material:** 2 whole, Dipolog City Fish Port; Lalao, San Juan, Siquijor, BRU 140, female, 465 mm TL, March 27, 2000; RSE 006, mature male, 390 mm TL, March 11, 1999.

**Remarks:** Herre (1953) didn’t mention this species in his checklist. Collected during WWF elasmobranch biodiversity project. BRU 140 in the photo catalogue agrees with descriptions in cited references.

### **Genus *Squaliolus* Smith & Radcliffe, 1912. Spined pygmy sharks.**

Genus *Squaliolus* Smith & Radcliffe, in Smith, 1912, Proc. U.S. Nat. Mus. 41(1877): 683. Type species: *Squaliolus laticaudus* Smith & Radcliffe, in Smith, 1912, by original designation.

#### ***Squaliolus aliae* Teng, 1959. Smalleye pygmy shark.**

*Squaliolus alii* Teng, 1959b, Taiwan Fish. Res. Inst. Lab. Fish. Biol. Rep. (9): 1, pl. 1. Holotype: Taiwan Fisheries Research Institute no. 3837, 187 mm TL female, off Tung-Kang, Taiwan, on bottom at about 330 m depth. Name corrected to *aliae* by Sasaki & Uyeno (1987, Japanese J. Ichthyol. 34(3): 373), because this species was named after the describer’s wife.

**References:** *Squaliolus aliae*: Sasaki & Uyeno, 1987: 373. USNM paratype of *S. laticaudus* from Philippines. Last & Stevens, 1994: 90, fig, pl. 9. Distribution, including Philippines. Compagno & Niem, 1998: 1229, fig. Range in Western Central Pacific, Philippines. *Euprotomicrus laticaudus*: Fowler, 1941: 266. In part, for paratype of *Squaliolus laticaudus*. *Squaliolus laticaudus*: Compagno, 1984: 108, in part, including fig.

**Philippine material:** None examined.

**Remarks:** Not collected by WWF elasmobranch biodiversity project. Often confused with *Squaliolus laticaudus*.

#### ***Squaliolus laticaudus* Smith & Radcliffe, 1912. Spined pygmy shark.**

*Squaliolus laticaudus* Smith & Radcliffe, in Smith, 1912, Proc. U.S. Nat. Mus. 41(1877): 684, fig. 4, pl. 50, 54. Holotype: United States National Museum of Natural History, USNM–70259, 146 mm TL male, RV *Albatross*

Sta. 5268, Batangas Bay, Luzon, Philippine Islands, 13°42'N, 120°57'15"E, in beam trawl fished on bottom at 311 m depth.

**References:** *Squaliolus laticaudus*: Bigelow & Schroeder, 1957: 131. Philippines. Compagno, 1984: 108 in part, not fig. Distribution, Philippines. Sasaki & Uyeno, 1987: 373. Compagno & Niem, 1998: 1229, fig. Range in Western Central Pacific, Philippines. *Euprotomicrus laticaudus*: Roxas & Martin, 1937: 15. Philippines. Fowler, 1941: 266. Philippines, holotype. Herre, 1953: 32. Batangas Bay, Batangas Province, Luzon, 311 m.

**Philippine material:** Holotype examined by L. Compagno.

**Remarks:** Both this species and *S. aliae* occur off the Philippines. Although readily separable to genus, specimens of *Squaliolus* should be carefully examined to determine their identity. See Sasaki & Uyeno (1987) for distinguishing features of *S. aliae* and *S. laticaudus*.

### Order Squatiniformes Jordan, 1923. Angel sharks.

Order Tectospondyli, Suborder Squatinoidei: Jordan, 1923, Stanford Univ. Publ., Univ. Ser., Biol. Sci., 3: 102.

### Family Squatinidae Bonaparte, 1838. Angel sharks.

Subfamily Squatinini Bonaparte, 1838, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 206 (Family Squalidae). Type genus: *Squatina* Dumeril, 1806.

#### Genus *Squatina* Dumeril, 1806. Angel sharks.

Genus *Squatina* Dumeril, 1806, Zool. Analyt.: 102. No species. Genus *Squatina* Dumeril in Risso, 1810, Ichthyol. Nice, Paris: 45. Type species: *Squatina vulgaris* Risso, 1810, by subsequent monotypy; a junior synonym of *Squalus squatina* Linnaeus, 1758 and unnecessary replacement according to Eschmeyer (1998, Catalog of Fishes, CD-ROM). Eschmeyer also noted that Dumeril applied the species name *angelus* to *Squatina* in 1808, with *S. angelus* an unneeded substitute for *S. squatina*, but neither Eschmeyer or the writer was able to examine Dumeril's account. If correct this shifts the type allocation from Risso to Dumeril.

#### *Squatina formosa* Shen & Ting, 1972. Taiwan angelshark.

*Squatina formosa* Shen & Ting, 1972, Bull. Inst. Zool., Acad. Sinica, Taiwan, 11(1): 21, fig. 4. Holotype: National Taiwan University, NTT 7213130, 337 mm TL immature male, 20°28.0'N, 120°26.3'E, S.W. Taiwan, 183 m.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-02-95, 1995-09-23, 363-385 m, 13°08.98-09.84'N, 124°04.72-00.01'E, immature female 328 mm TL, 334 mm to the ventral tail tip, at South African Museum.

**Remarks:** The single specimen agrees with the original description of the holotype of *Squatina formosa* in most anatomical details.

#### ?*Squatina japonica* Bleeker, 1858. Japanese angelshark.

*Squatina japonica* Bleeker, 1858, Act. Soc. Sci. Ind. Neer. (Japon.) 3: 40. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH-7416, 525 mm TL male, Nagasaki, Japan.

**References:** ?*Rhina squatina*: Casto de Elera, 1895: 617. Navotas, Manila, Luzon. *Squatina japonica*: Fowler, 1941: 285. Casto de Elera's record, no specimens. Compagno & Niem, 1998: 1237, fig. Western Central Pacific, Philippines.

**Philippine material:** None examined.

**Remarks:** Casto de Elera's record was cited by Fowler (1941) as *Squatina japonica*, which needs to be confirmed. Herre (1953) omitted mention of any records of *Squatina* from his Philippine checklist.

## Order Pristiophoriformes White, 1936. Sawsharks.

Order Squalia, Suborder Squalida, Superfamily Pristiophoridae: White, 1936, Amer. Mus. Novit. (837): 5.

### Family Pristiophoridae Bleeker, 1859. Sawsharks.

Family Pristiophoroidei Bleeker, 1859, Act. Soc. Sci. Indo-Neerl. 6: xii. Type genus: *Pristiophorus* Müller & Henle, 1837.

#### Genus *Pristiophorus* Müller & Henle, 1837. Fivegill sawsharks.

Genus *Pristiophorus* Müller & Henle, 1837a, Ber. K. preuss. Akad. wiss. Berlin, 2: 116. Type species: *Pristis cirratus* Latham, 1794, by monotypy. Also Müller & Henle, 1837, Arch. Naturg. 3: 399; Müller & Henle, 1838, Mag. Nat. Hist., n. ser., 2: 89 (“*Pristis cirrhatus*, Latham” designated as type species); Müller & Henle, 1838, L’Institut, 6: 65; Müller & Henle, 1839, Syst. Besch. Plagiost., pt. 2: 97.

#### *Pristiophorus* sp. C [Compagno & Niem, 1998]. Philippine sawshark.

**References:** *Pristiophorus cirratus*: Fowler, 1941: 280. USNM 10170 (now USNM-151231 according to Springer & Bullis, 1960), Albatross D. 5536, from Apo Island, 9°15.75'N, 123°22.00'E, between Negros and Siquijor and off Zamboanguita, Oriental Negros Province, Negros.. Herre, 1953: 33. On Fowler’s specimen. Compagno, 1984: 133. Philippine sawsharks examined, possibly referable to this species. *Pristiophorus japonicus*: Compagno, 1984: 134. Philippine sawsharks examined, possibly referable to this species. *Pristiophorus* sp.: Springer & Bullis, 1960: 253. *Pristiophorus* sp. C: Compagno & Niem, 1998: 1236, fig. Western Central Pacific, Philippines.

**Philippine material:** CAS-34193, 396 mm TL female (alcian-alizarin specimen) from Camurines (Camarines) Sur Province, Ragay Gulf, Siburio Pt., Luzon, Philippines, est. ca. 13°33'N, 122°48'E, 319–324 fa. (584–593 m); CAS 34930, 725 mm TL female, Batangas Province, Balayan Bay, S. of Barrio Salong, Philippines, est. ca. 13°44'N, 121°0.0'E, 125–135 fa. (229–247 m).

**Remarks:** This is an undescribed species, previously misidentified as the Australian *Pristiophorus cirratus* and confused with *P. japonicus* (Compagno & Niem, 1998).

## Order Rajiformes Müller & Henle, 1841. Batoids.

[Part] 2, Rajae: Müller & Henle, 1841, Syst. Besch. Plagiost. (3): 103.

### Suborder Pristoidei Gill, 1893. Sawfishes.

Order Hypotremi, Suborder Sarcura, (group) Pristoidea Gill, 1893, Natn. Acad. Sci. (U.S.) Mem. 6, 6: 130.

### Family Pristidae Bonaparte, 1838. Modern sawfishes.

Subfamily Pristidini Bonaparte, 1838, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 206 (Family Rajidae). Type genus: *Pristis* Latham, 1794 = *Pristis* Linck, 1790.

#### Genus *Anoxypristis* White & Moy-Thomas, 1941. Knifetooth sawfishes.

Genus *Anoxypristis* White & Moy-Thomas, 1941, Ann. Mag. Nat. Hist., ser. 11, 7(40): 397. Replacement for *Oxypristis* Hoffman, 1913, Zool. Jahrb. 33: 334, a junior homonym of *Oxypristis* Signoret, 1861 (Hemiptera), and therefore taking the same type species, *Pristis cuspidatus* Latham, 1794.

#### *Anoxypristis cuspidata* (Latham, 1794). Knifetooth sawfish.

*Pristis cuspidatus* Latham, 1794, Trans. Linnaean Soc. London, 2: 279, pl. 26, fig. 3. Syntypes: Two rostral saws, one in Latham’s private collection about 1.5' (457 mm) long, and another over 2.5' (762 mm) long in the collection of a Mr. Parkinson; both had 28/28 rostral teeth. No locality.

**References:** *Pristis cuspidatus*: Fowler, 1941: 296. No Philippine records. Herre, 1953: 34. 5490 mm TL specimen with saw at Cebu, Cebu Province, Philippines, apparently not lodged in the Stanford University fish collection and uncertain if preserved elsewhere (L. Compagno). *Anoxypristis cuspidatus*: Last & Stevens, 1994: 361, fig. pl. 43. Distribution, no Philippine records. Compagno & Last, 1999: 1413, fig. Western Central Pacific, including Philippines.

**Philippine material:** None seen by WWF elasmobranch biodiversity project.

**Remarks:** Formerly common in the Western Central Pacific, apparently declining in some areas.

**Genus *Pristis* Linck, 1790. Narrowtooth sawfishes.**

Genus *Pristis* Linck, 1790, Mag. Neueste Phys. Naturg. Gotha 6: 31. Type species: *Squalus pristis* Linnaeus, 1758, by absolute tautonymy and monotypy.

***Pristis microdon* Latham, 1794. Freshwater sawfish.**

*Pristis microdon* Latham, 1794, Trans. Linnaean Soc. London, 2: 280, pl. 26, fig. 4. Holotype: A specimen in the private collection of a Mr. Parkinson, 28" (711 mm) TL, apparently with saw length 10" (254 mm). No locality. No type material according to Krefft & Stehmann (1973, *In* J. C. Hureau and T. Monod (eds.), CLOFNAM. Check-list. fish. NE Atlantic Mediterranean, 1: 51), so the holotype may be lost.

**References:** *Pristis perrotetti*: Meyer, 1885: 48. Laguna de Bay (Luzon). *Pristis perrotetti*: Palacky, 1891: 230. Philippines. *Pristis microdon*: Roxas & Martin, 1937: 15. Philippines. Fowler, 1941: 295. Records from Lake Naujan, Mindoro; Laguna de Bay, Luzon. Herre, 1953: 33. Common in the Philippines, including fresh water catches in Lake Naujan, Mindoro; Luzon (Laguna de Bay, Laguna Prov; Bikol River, Camarines Sur Province); Mindanao (Rio Grande and Liguasan Swamp, Cotabato Province, and Agusan R. at Moncayo, Davao Province). Last & Stevens, 1994: 364, fig. pl. 42. Distribution, questionable in Philippines. Compagno & Last, 1999: 1415, fig. Western Central Pacific, Philippines.

**Philippine material:** Stanford University, SU-26882, 319 mm TL fetal male, 319 mm TL fetal female, Laguna de Bay, Luzon, Philippines.

**Remarks:** Population probably has greatly declined in the Philippines.

**?*Pristis pectinata* Latham, 1794. Smalltooth sawfish.**

*Pristis pectinatus* Latham, 1794, Trans. Linnaean Soc. London, 2: 278, pl. 26, fig. 2. Latham apparently examined more than one specimen, but did not give specifics on any of them except for illustrating a recognizable rostral saw with 31/31 teeth which could serve as the holotype if it could be located. "Habitat in oceano." No type material according to Krefft & Stehmann (1973, *In* J. C. Hureau and T. Monod (eds.), CLOFNAM. Check-list. fish. NE Atlantic Mediterranean, 1: 52), so the illustrated saw and possible holotype is presumably lost.

**References:** ?*Pristis pectinatus*: Casto de Elera, 1895: 613–621. Philippines. Fowler, 1941: 291. Luzon, Manila Bay, Laguna de Bay, possibly based on *P. zijsron* in part? Fowler had no Philippine records of the latter species. ?*Pristis pectinata*: Last & Stevens, 1994: 365, fig. pl. 43. Distribution, Philippine records. Compagno & Last, 1999: 1416, fig. Western Central Pacific, possibly Philippines.

**Philippine material:** None.

**Remarks:** Of uncertain occurrence in Philippines. Herre (1953) had no records of *P. pectinata* from the Philippines and the presence of this species in the Indo–West Pacific seems unlikely. In Australian and South African seas, it is confused with *P. zijsron*.

***Pristis zijsron* Bleeker, 1851. Green sawfish.**

*Pristis zijsron* Bleeker, 1851, Nat. Tijds. Ned. Indie, 2: 417, 442. Holotype: Described from a saw 39" (991 mm.) long, off a specimen from a river in Bandjermassing, Borneo.

**References:** *Pristis zijsron*: Fowler, 1941: 294. No Philippine records. Last & Stevens, 1994: 366, fig. pl. 43. Distribution, no Philippine records. Compagno & Last, 1999: 1417, fig. Western Central Pacific, Philippines.

**Philippine material:** Stanford University, SU-40862, 366 mm rostral saw, Zamboanga, Mindanao, Philippines, examined by L. Compagno.

**Remarks:** Conservation status uncertain, likely to have declined in Philippine waters as elsewhere.

### **Suborder Rhinoidei McEachran, Dunn & Miyake, 1996. Sharkrays.**

Order Rhiniformes McEachran, Dunn & Miyake, 1996, in Stiassny *et al.*, Interrelationships fishes: 80.

### **Family Rhinidae Müller & Henle, 1841. Sharkrays.**

“Gruppe” Rhinae Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 110. Type genus: *Rhina* Bloch & Schneider, 1801.

**Local names:** Angelfish.

### **Genus *Rhina* Bloch & Schneider, 1801. Sharkrays.**

Genus *Rhina* Bloch & Schneider, 1801, Syst. Ichthyol.: 352. Type species: *Rhina ancylostomus* Bloch & Schneider, 1801, by subsequent designation of Jordan (1917, Gen. Fish. 1: 59). According to Eschmeyer (1998, Catalog of Fishes, CD-ROM), “Type designated by indication under ICZN Opinion 6. On Official List.”

### ***Rhina ancylostomus* Bloch & Schneider, 1801. Sharkray.**

*Rhina ancylostomus* Bloch & Schneider, 1801, Syst. Ichthyol.: 352, pl. 72. Two small specimens “long. ad finem caudae 21, lat. cum pinnis pectoralibus 31/2 pollices”, Coromandel, India. Syntype: Universität Humboldt, Museum für Naturkunde, Berlin, Germany, ZMB 4621, one stuffed syntype of two (about 546 mm TL), missing according to Paepke & Schmidt (1988, Mitt. Zool. Mus. Berlin 64 [1]: 175).

**References:** *Rhynchobatus ancylostomus*: Casto de Elera, 1895: 613–621. Cavite, Santa Cruz, Luzon. *Rhina ancylostoma*: Fowler, 1941: 299. Luzon, Cavite, Santa Cruz. Herre, 1953: 35. *Theodore N. Gill* sta. SW of entrance to Manila Bay, 64 m. Last & Stevens, 1994: 296, fig, pl. 42. Distribution, including Philippines. Compagno & Last, 1999: 1421. Western Central Pacific, including Philippines.

**Philippine material:** 2 pair dried jaws, photos, claspers, Suba, Pasil and Pasil Fish Market, Cebu City; San Jose, Taytay, JPAG 171, unknown sex, unknown TL, April 19, 1999; JPAG 363, unknown sex, unknown TL, May 27, 1999; JPAG 188, male, unknown TL, May 18, 1999; JPAG 196, unknown sex, unknown TL, July 2, 1999.

**Remarks:** This large, unmistakable batoid is declining in abundance in some parts of the South China Sea.

### **Suborder Rhynchobatoidei McEachran, Dunn & Miyake, 1996. Wedgefishes.**

Order Rhynchobatiformes McEachran, Dunn & Miyake, 1996 in Stiassny *et al.*, Interrelationships fishes: 80.

**Local names:** Arado; Barewan; Immaradu; Pating sodsod (Herre, 1953) are Philippine names for *R. djiddensis*, and probably apply to *R. australiae* and other species.

### **Family Rhynchobatidae Garman, 1913. Wedgefishes.**

Subfamily Rhynchobatinae Garman, 1913 (Family Rhinobatidae), Mem. Harvard Mus. Comp. Zool., 36: 266. Type genus: *Rhynchobatus* Müller & Henle, 1837.

### **Genus *Rhynchobatus* Müller & Henle, 1837. Wedgefishes.**

Genus *Rhynchobatus* Müller & Henle, 1837a, Ber. K. preuss. Akad. wiss. Berlin, 2: 116. Type species: “*R. laevis*” by monotypy, = *Rhinobatus laevis* Bloch & Schneider, 1801.

**Specimens of uncertain identity:** *Rhynchobatus* sp. photos, Malabon Fish Port, Manila, JPAG 361, unknown sex, unknown TL, October 19, 2000; *Rhynchobatus* sp. 1?, photos, Malabon Fish Port, Manila, JPAG 360, unknown sex, unknown TL, October 19, 2000; *Rhynchobatus* sp. 2 (?), photos, Pasil Fish Port I, Cebu City, JPAG 322, male, unknown TL, April 13, 2000.

**Records of uncertain identity:** *Rhynchobatus djiddensis*: Casto de Elera, 1895: 619. Samar, Luzon, Santa Cruze, Cavite. *Rhynchobatus djiddensis*: Roxas & Martin, 1937: 16. Philippines. Fowler, 1941: 302. *Albatross* stations 4528, 5250, 6728, specimens from Manila market. Herre, 1953: 36. Philippine records from SW Samar; Manila Bay, Cayan Province, Lingayen Gulf, Pangasinan Province, Aloneros, Ragay Gulf, Tayabas Province,

in Luzon; Culion; Iloilo, Iloilo Province, Panay; Cebu market; Tacloban mkt, Leyte; Dapitan and Zamboanga, Zamboanga Province, Mindanao; Jolo, Siasi, Bongao, and Sitankai, Sulu Province. Probably comprising two or three species.

***Rhynchobatus australiae* Whitley, 1939. Whitespotted wedgefish.**

*Rhynchobatus djiddensis australiae* Whitley, 1939, Aust. Zool. 9(3): 245, fig. 14. Holotype: Australian Museum (Sydney), AMS-IA 4959, 1305 mm TL female, from off Manning River, New South Wales, Australia.

**References:** *Rhynchobatus djiddensis*: ?Fowler, 1941: 301. ?In part, Philippines. Herre, 1953: 35. In part, Philippines. Last & Stevens, 1994: 400, fig, pl. 69. Distribution, Philippines in part. *Rhynchobatus australiae*: Compagno & Last, 1999: 1421. Western Central Pacific, including Philippines.

**Philippine material:** Stanford University, SU-14404, 500 mm TL immature male, Sulo, Panay; SU-13558, 550 mm TL immature female, Manila Bay, Luzon; Bishop Museum, BPBM-26487, 813 mm TL immature male, Cebu City, Cebu. 7 whole, 1 with fins missing, 1 pair dried jaws, Suba, Pasil and Pasil Fish Port I, Cebu City; Iloilo City Fish Port; Palapala Fish Port, Cadiz City, JPAG 285, immature male, 521 mm TL, April 7, 2000; JPAG 320a, immature male, 553 mm TL, April 12, 2000; JPAG 326, female, 554 mm TL, April 12, 2000; BRU 030, female, unknown TL, February 13, 1999; JPAG 276, female, 530 mm TL, June 4, 2000; BRU 088, immature male, 768 mm TL, April 16, 1999; JPAG 156, immature male, 580 mm TL, April 23, 1999; JPAG 157, female, 522 mm TL, April 23, 1999; JPAG 327, female, 701 mm TL, April 12, 2000; JPAG 173, unknown sex, unknown TL, April 19, 1999.

**Remarks:** Common Western Central Pacific wedgefish only recently reported as *R. australiae* from the Philippines by Compagno & Last (1999) but long mistaken for the Western Indian Ocean *R. djiddensis* in the Western Central Pacific. JPAG 156, 157, 276, and 285 radiographed and found to agree with other *R. australiae* including the holotype in vertebral and pectoral radial counts.

**?*Rhynchobatus cf. laevis* (Bloch & Schneider, 1801). Smoothnose wedgefish.**

*Rhinobatus laevis* Bloch & Schneider, 1801, Syst. Ichthyol.: 354, pl. 71. No type specimens, Tranquebar, India.

?*Rhynchobatus yentiniensis* Wang, 1933, Contr. Biol. Lab. Sci. Soc. China, Zool. Ser., 9(3): 98, fig. 4. Holotype: Museum of the Biological Laboratory, Science Society of China, SSCN 10881, 1010 mm TL immature male, mounted skin, Yenting, Wenchow, China. Status of holotype not indicated by Eschmeyer (Catalog of Fishes, CD-ROM).

**References:** Compagno & Last, 1999: 1422, fig. Western Central Pacific, no Philippine records.

**Philippine material:** None seen by the WWF elasmobranch biodiversity project, although material was examined from elsewhere in the Indo-West Pacific.

**Remarks:** Not recorded by Compagno & Last (1999) or collected during the WWF project from the region but to be expected. Possibly confused with other species.

***Rhynchobatus* sp. 2 [Compagno & Last, 1999]. Broadnose wedgefish.**

**References:** *Rhynchobatus* sp. 2 Compagno & Last (1999): 1422, fig. Western Central Pacific, including Philippines. ?*Rhynchobatus djiddensis*: Fowler, 1941: 300. In part, Philippines. Herre, 1953: 35. In part, Philippines.

**Philippine material:** Stanford University, SU-13330, 480 mm TL immature female, no further data; SU-13558, 450 mm TL immature female, Manila Bay; George Vanderbilt Foundation, GVF-no # 450 mm TL immature male, Manila Bay.

**Remarks:** This apparently undescribed species is common in the Western Central Pacific, but has generally been mistaken for *Rhynchobatus djiddensis* from the Western Indian Ocean.

**Suborder Rhinobatoidei Garman, 1913. Guitarfishes.**

Order Plagiostoma, Suborder Platosomia, "Group" Rhinobatoidei Garman, 1913, Mem. Mus. Comp. Zool. Harvard 36: 257, 258.



### Family Rhinobatidae Müller & Henle, 1837. Guitarfishes.

Family Rhinobatus Müller & Henle, 1837, Ber. K. preuss. Akad. wiss. Berlin, 2: 116. 1837, Arch. Naturg. 3: 399. Type genus: *Rhinobatus* Bloch & Schneider, 1801.

#### Genus *Glaucostegus* Bonaparte, 1846. Rough guitarfishes.

Genus *Glaucostegus* Bonaparte, 1846, Cat. Pesc. Europ.: 14. Type species: *Rhinobatus cemiculus* St.-Hilaire, 1827. Type-designation by Whitley, 1939, Australian Zool. 9(3): 244 as haplotype.

#### *Glaucostegus granulatus* (Cuvier, 1829). Sharpnose guitarfish.

*Rhinobatus granulatus* Cuvier, 1829, Reg. Anim., ed. 2, 2: 396. Syntypes: Museum National d'Histoire Naturelle, Paris, MNHN 1253 and MNHN-1254, according to Seret & McEachran (1986, Bull. Mus. Natl. Hist. Nat. [4A], 8[4], Suppl: 11).

**References:** *Rhinobatos granulatus*: Fowler, 1941: 315. *Albatross* 9385 from Cebu Market, *Albatross* 7621, Mouth of Malampaya River and vicinity. Herre, 1953: 37. Records from Cebu mkt, Cebu; mouth of Malampaya R. and vicinity, Malampaya Sound, w. coast of Palawan; *Theodore N. Gill* station in China Sea off Bataan Pen., Luzon, Philippines in 119 m Compagno & Last, 1999: 1428. Western Central Pacific, Philippines.

**Philippine material:** None.

**Remarks:** An Indian Ocean species often confused in the Indo–West Pacific with another large, long-nosed guitarfish, *Glaucostegus typus*. Record for the region needs validation.

#### *Glaucostegus halavi* (Forsskål, 1775). Halavi guitarfish.

*Raja halavi* Forsskål, 1775, Descript. Animal.: 8, 19. No type material according to Krefft & Stehmann (1973, In J. C. Hureau and T. Monod (eds.), CLOFNAM. Check-list. fish. NE Atlantic Mediterranean, 1: 54), and Eschmeyer (1998, Catalog of Fishes, CD-ROM). Djedda, Red Sea.

**References:** *Rhinobatus halavi*: Casto de Elera, 1895: 619. La Union, Luzon. Roxas & Martin, 1937: 16. Philippines. *Rhinobatos halavi*: Fowler, 1941: 320. Casto de Elera's record, no specimens from Philippines. Randall & Compagno, 1995: 291, fig. 2. Records beyond known range of this species from Red Sea to Gulf of Oman need confirmation. Compagno & Last, 1999: 1429. Western Central Pacific, Philippines, record suspect.

**Philippine material:** None.

**Remarks:** Likely misidentification.

#### *Glaucostegus typus* (Bennett, 1830). Giant shovelnose ray.

*Rhinobatus typus* Bennett, 1830, In S. Raffles, Mem. Life Pub. Serv. Sir Thomas Stamford Raffles, London, Fishes: 694. Holotype: British Museum (Natural History), ex Zoological Society of London, Sumatra, Indonesia, not found according to Eschmeyer (1998, Catalog of Fishes, CD-ROM), who listed the authorship of this species as Anonymous (Bennett).

*Rhinobatus armatus* Gray, 1834, Illustr. Indian Zool. Hardwicke, 2, pts. 13–14, pl. 99. Holotype: British Museum (Natural History), BMNH 1953.8.10.11, India, according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

*Rhinobatos batillum* Whitley, 1939, Australian Zool. 9(3): 245, fig. 13. Syntypes: Types not mentioned as such, but two specimens mentioned by Whitley and qualifying as syntypes are a 107 cm TL immature male from Denham, Sharks Bay, Western Australia (illustrated), and a 108 cm TL male from North-West Islet, Queensland. According to Eschmeyer (1998, Catalog of Fishes, CD-ROM) the holotype is in Whitley's collection, with deposition unknown.

**References:** *Rhinobatos typus*: Fowler, 1941: 319. No Philippine records. *Rhinobatos armatus*: Herre, 1953: 37. Sitankai, Sulu Province, Philippines. Last & Stevens, 1994: 290, fig. pl. 39. Distribution, no Philippine records. Compagno & Last, 1999: 1429. Western Central Pacific, Philippines.

**Philippine material:** None.

**Remarks:** Most common large guitarfish in the Western Central Pacific. Its absence from WWF collection is surprising given its frequent occurrence in nearby Borneo and eastern Indonesia.

**Genus *Rhinobatos* Linck, 1790. Guitarfishes.**

Genus *Rhinobatos* Linck, 1790, Mag. Neueste Phys. Naturg. Gotha 6: 32. No species indicated in original description, but *Raja rhinobatos* Linnaeus, 1758, is possibly the type by absolute tautonymy.

**Identity uncertain:** *Rhinobatos* sp, 1 pair dried jaws, Pantano, Taytay, JPAG 195, unknown sex, unknown TL, June 29, 1999; 1 whole, Pasil Fish Port I, Cebu City, JPAG 310, male, 621 mm TL, April 10, 2000; *Rhinobatos* is in need of revision as several species exist in the Indo-Pacific and many of these have been confused with nominal Japanese species. In addition to *Glaucostegus typus*, formerly placed in *Rhinobatos*, only one other species probably occurs in the region.

**?*Rhinobatos formosensis* Norman, 1926. Taiwan guitarfish.**

*Rhinobatus formosensis* Norman, 1926, Proc. Zool. Soc. London 1926 (62): 958, fig. 11. Syntypes: British Museum (Natural History), BMNH 1862.12.6.69–70, two males, 625 and 630 mm TL, Formosa, catalog numbers from Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Rhinobatos formosensis*: Fowler, 1941: 307. Taiwan, no Philippine records. Herre, 1953: 37. Theodore N. Gill station in China Sea off mouth of Manila Bay, 9.5 nm south of Bataan Pen., Luzon, in 119 m Compagno & Last, 1999: 1427. Western Central Pacific, Philippines.

**Philippine material:** None examined by the WWF elasmobranch biodiversity project.

**Remarks:** Record uncertain, needs confirmation.

***Rhinobatos* cf. *schlegelii* Müller & Henle, 1841. Philippine guitarfish.**

*Rhinobatus (Rhinobatus) schlegelii* Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 123, pl. 42. Syntypes: Three stuffed and six alcohol specimens indicated by Müller & Henle in Rijksmuseum van Natuurlijke Historie, Leiden, from Japan. Lectotype, RMNH D2680 (dry); paralectotypes, ?BMNH (1); RMNH D2681 and D2684–2687 (5, dry), RMNH D2689 (1, dry), 4225 (4), according to Eschmeyer (1998, Catalog of Fishes, CD-ROM, but not examined by him).

**References:** *Rhinobatos schlegelii*: Casto de Elera, 1895: 619. Navotas, Manila, Luzon. Fowler, 1941: 308. Listing of Casto de Elera's record but no new specimens. Compagno & Last, 1999: 1429. Western Central Pacific, Philippines.

**Philippine material:** 19 whole, Suba, Pasil and Pasil Fish Port I, Cebu City; Dipolog City Public Market; Palapala Fish Port, Bacolod City; Palapala Fish Port, Cadiz City; Punta Miray, Baliangao; Silliman Beach, Dumaguete City, RSE 005, male, 705 mm TL, March 4, 1999; JPAG 047a, immature male, 556 mm TL, March 21, 1999; JPAG 277, female, 632 mm TL, April 6, 2000; JPAG 278, female, 690 mm TL, April 6, 2000; JPAG 300, immature male, 647 mm TL, April 10, 2000; JPAG 301, female, 497 mm TL, April 10, 2000; JPAG 306, immature male, 555 mm TL, April 10, 2000; JPAG 307, immature male, 497 mm TL, April 10, 2000; JPAG 308, mature male, 636 mm TL, April 10, 2000; JPAG 309, immature male, 476 mm TL, April 10, 2000; JPAG 311, female, 473 mm TL, April 10, 2000; JPAG 079, immature male, 593 mm TL, April 10, 1999; JPAG 043, mature male, 643 mm TL, March 21, 1999; JPAG 045, female, 661 mm TL, March 21, 1999; BRU 071, female, 820 mm TL, April 15, 1999; BRU 072, female, 820 mm TL, April 15, 1999; BRU 073, male, 720 mm TL, April 15, 1999; BRU 074, female, 844 mm TL, April 15, 1999; BRU 144, immature male, 317 mm TL, March 28, 2000; MMLM 001, female, 780 mm TL, March 1, 1999; MMLM 012, female, 700 mm TL, April 1, 1999.

**Remarks:** Herre (1953) did not report this species in his Philippine checklist. Guitarfishes referred to as *Rhinobatos schlegelii* Müller & Henle comprise a species complex in the Indo-Pacific. The Philippine form is not conspecific with *R. schlegelii* (which occurs off Japan and Taiwan) and appears to be undescribed. It differs from *R. schlegelii* in body form, squamation, and colour pattern. Types of *Rhinobatos schlegelii* examined by P. Last and L. Compagno.

**?Suborder Platyrrhinoidei: McEachran, Dunn & Miyake, 1996. Fanrays and thornbacks.**

Order Myliobatiformes, Suborder Platyrrhinoidei: McEachran, Dunn & Miyake, 1996, in Stiassny *et al.*, Interrelationships fishes: 80.

### ?Family Platyrrhinidae Jordan, 1923. Fanrays and thornbacks.

Family Platyrrhinidae Jordan, 1923, *Class. Fish., Stanford U. Pub., Univ. Ser., Bio. Sci.* 3(2): 103. Type genus: *Platyrrhina* Müller & Henle, 1838.

#### ?Genus *Platyrrhina* Müller & Henle, 1838. Fanrays.

Genus *Platyrrhina* Müller & Henle, 1838a, *Mag. Nat. Hist., n. ser.*, 2: 90. No species listed. Subsequent restriction through Müller & Henle, 1838a, *in Bonaparte, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2*: 205. Type species: “*Raja sinensis*, Lacépède”, by monotypy, = *Rhina sinensis* Bloch & Schneider, 1801.

#### ?*Platyrrhina sinensis* (Bloch & Schneider, 1801). Fanray.

*Rhina sinensis* Bloch & Schneider, 1801, *Syst. Ichthyol.*: 352. “Habitat in Mari Sinensi”. Based on the ‘Raie chinoise’ of Lacépède (1798, *Hist. Nat. Poiss.* 1: 34, 157, pl. 2, fig. 1).

**References:** *Platyrrhina sinensis*: Casto de Elera, 1895: 613–621. Philippines. Fowler, 1941: 329. Not listed from Philippines. Compagno & Last, 1999: 1432. Western Central Pacific, not listed from Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) did not list this species in his checklist. Casto de Elera’s record is uncertain; this well-known ray is difficult to mistake for other local batoids and the record is plausible. The species occurs in adjacent parts of the South China Sea off Viet-Nam, China and Taiwan.

### Suborder Torpedinoidei Gill, 1893. Electric rays.

Order Hypotremi, Suborder Sarcura, (group) Torpedinoidea Gill, 1893, *Natn. Acad. Sci. (U.S.) Mem.* 6, 6: 130.

### Family Narcinidae Gill, 1862. Numbfishes.

Subfamily Narcininae Gill, 1862 (Family Torpedinoidea or Narcinontoidae), *Ann. Lyceum Nat. Hist. New York*, 7(32): 387. Type genus: *Narcine* Henle, 1834.

#### Genus *Narcine* Henle, 1834. Numbfishes.

Genus *Narcine* Henle, 1834, *Ueber Narcine*, 2, 31. Type species: *Torpedo brasiliensis* Olfers, 1831, by subsequent restriction of Bonaparte, 1838, *Ann. Soc. Nat. Bologna* 2: 205. Account of this genus follows de Carvalho, Compagno & Last (1999) and particularly de Carvalho’s (1999) revision of the Narcinidae.

#### *Narcine lingula* Richardson, 1846. Chinese numbfish.

*Narcine lingula* Richardson, 1846, *Rep. British Ass. Advancem. Sci., 15th meet.*, 1845: 196. Possible syntypes: British Museum (Natural History), BMNH 1848.3.18.178–179, 213 mm TL, 103 mm DW adult male, 226 mm TL, 116 mm DW female, China Seas, examined by L. Compagno.

**References:** *Narcine timlei*: Fowler, 1941: 334. No Philippine records. Herre, 1953, *in part*: 40. Gulf of Lingayen; Manila Bay; Mangarin, Mindoro; Malampaya Sound, Palawan; Sulu Sea. De Carvalho, Compagno & Last, 1999, *in part*: 1441. Western Central Pacific, Philippines. *Narcine lingula*: De Carvalho, 1999: 138. Philippines records cited but no specimens were examined.

**Philippine material:** No specimens examined by the WWF elasmobranch biodiversity project. The California Academy of Sciences fish database (CAS URL 2005) had no Philippine specimens of *Narcine*.

**Remarks:** The identification of this species as *Narcine lingula* rather than *N. timlei* (Bloch & Schneider, 1801) is based on de Carvalho (1999). The true *N. timlei* as established by the identity of its syntypes and designation of a lectotype by de Carvalho (1999) is a dwarf, uniform-colored Indo–West Pacific species usually recorded as its synonyms *N. indica* Henle, 1834 and *N. brunnea* Annandale, 1909. *N. timlei* is currently not known from the Philippines although it occurs in the nearby South China Sea. It is possible that Herre’s (1953) records of ‘*N. timlei*’ from the Philippines included both *H. lingula* and *N. sp. H* (see below), but no *Narcine* are reported in the Stanford fish collection that were collected by Herre from the Philippines (CAS URL, 2004). Conservation

status of *N. lingula* and other members of its genus is of concern in the Western North Pacific because of their inshore benthic habitat, low abundance, and the presence of intensive demersal fisheries.

***Narcine* sp. nov. H. de Carvalho, 1999. Darkfin numbfish.**

**References:** ?*Narcine timlei*: Herre, 1953, in part, 40, for Philippine records of *N. lingula* cited above. *Narcine maculata*: de Carvalho, Compagno & Last, 1999: 1441 in part, fig. Philippines from Sibuyan and Visayan Seas. *Narcine* sp. nov. H. de Carvalho, 1999: 263. Records from Myanmar (Burma, Andaman Sea near Irrawaddy River mouths on bottom at 44–64 m; CAS URL 2005), Thailand (Gulf of Thailand), Viet-Nam, and Philippines.

**Philippine material:** No specimens examined by the WWF elasmobranch biodiversity project. De Carvalho (1999: 271) cited material of this undescribed species from Myanmar (CAS-58358 and 58359) and the Philippines (USNM-137884, 263394, 263398, 263399, 263400, 263401, 263402, and 263403). The U.S. National Museum of Natural History fish collection database (USNM URL 2004) indicated that most of the USNM Philippine specimens of *Narcine* sp. H. were collected in the Visayan Sea between northern Negros and Masbate Island, while one lot came from the Visayan Sea in the vicinity of Samar and Leyte and another lot were collected further north between Marinduque and Luzon. All specimens were collected in 1978 and 1979 on the bottom on the insular shelves at depths of 0 to 91 m.

**Remarks:** This species is listed from the Philippines based on eight lots of unidentified *Narcine* in the U.S. National Museum of Natural History fish collection (de Carvalho, 1999, and USNM 2004). According to de Carvalho this species was apparently confused with *Narcine maculata* (Shaw, 1804) in the Gulf of Thailand, off Viet-Nam and in the Philippines. The California Academy of Sciences fish collection database (CAS URL, 2005) indicates that three CAS specimens of this species from Myanmar were confused with *N. timlei*.

**Family Narkidae Fowler, 1934. Sleeper rays.**

Subfamily Narkinae Fowler, 1934, Proc. Acad. Nat. Sci. Philadelphia, 85: 240 (Family Torpedinidae). Type genus: *Narke* Kaup, 1826.

**Genus *Narke* Kaup, 1826. Onefin sleeper rays.**

Genus *Narke* Kaup, 1826a, Isis, 18: 88. Also Kaup, 1826b, Arch. Anat. Physiol. 1826: 365. Type species: *Raja capensis* Gmelin, 1788, by monotypy?

**?*Narke dipterygia* (Bloch & Schneider, 1801). Spottail sleeper ray.**

*Raja dipterygia* Bloch & Schneider, 1801, Syst. Ichthyol.: 359. Holotype: Universität Humboldt, Museum für Naturkunde, Berlin, ZMB-5483, 55 mm TL immature male, Tranquebar, India according to Paepke & Schmidt (1988, Mitt. Zool. Mus. Berlin 64 [1]: 171–172).

**References:** Fowler, 1941: 350. Not listed from Philippines. Compagno & Last, 1999: 1445. Western Central Pacific, possibly Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) did not list this species in his checklist. Record doubtful.

**Genus *Temera* Gray, 1831. Finless sleeper rays.**

Genus *Temera* Gray, 1831, Zool. Misc.: 7. Type species: *Temera hardwicki* Gray, 1831, by monotypy.

**?*Temera hardwickii* (Bloch & Schneider, 1801). Finless sleeper ray.**

*Temera hardwickii* Gray, 1831, Zool. Misc.: 7. Holotype: British Museum (Natural History) uncatalogued, 139 mm TL, 73 mm DW female, from Penang, Malaysia.

**References:** *Temera hardwickii*: Gogorza y Gonzales, 1885: 74. Museo Ultramarino; Philippines. Gogorza y Gonzales, 1888: 393. Philippines. Casto de Elera, 1895: 613–621. Philippines. Fowler, 1941: 350. Not listed from Philippines. Compagno & Last, 1999: 1445. Western Central Pacific, not listed from Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) did not list this species in his checklist. Record uncertain; this unusual little electric ray lacks dorsal fins and is hard to mistake for any other batoid. This species is otherwise known from the Andaman

Sea and Straits of Malacca southeast to the Malay Peninsula, Singapore, and Viet-Nam.

### **Family Torpedinidae Bonaparte, 1838. Torpedo rays.**

Subfamily Torpedinini Bonaparte, 1838, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 130 (Family Rajidae).

#### **Genus *Torpedo* Houttuyn, 1764. Torpedo rays.**

Genus *Torpedo* Houttuyn, 1764, Nat. Hist. Dieren, Planten, Mineral., 1(6): 453. Fowler, 1941 (Bull. U.S. Natn. Mus., (100) 13: 341), Bigelow & Schroeder, 1953 (Mem. Sears Fnd. Mar. Res. (1), 2: 90), and Krefft & Stehmann (1973, in Hureau & Monod, Checklist. fish. N.E. Atlantic Mediterranean, 1:55) accepted its type to be *Raja torpedo* Linnaeus, 1758, although no species were mentioned in the genus. Type can be considered as fixed by subsequent monotypy or by absolute tautonymy (Fowler, 1941, Eschmeyer, 1998, Catalog of Fishes, CD-ROM).

#### ***Torpedo* sp. 1. Philippine spotted torpedo.**

**References:** *Torpedo marmorata*: Fowler (1941): 342. USNM specimen, San Andreas (San Andres?) Is. off w. side of Marinduque Is, Philippines in 92 m depth. Herre, 1953: 41. Fowler's record. *Torpedo* sp. Compagno & Last, 1999: 1451. Western Central Pacific, possibly Philippines.

**Philippine material:** None examined.

**Remarks:** Referred by Fowler (1941) and Herre (1953) to the Eastern Atlantic *Torpedo marmorata* Risso, 1810, but probably not identical to that species as margins of spiracles lack papillae and the colour pattern is different (Compagno & Last, 1999). We could not locate the USNM specimen on the fish database (USNM, 2004) nor were there any Philippine *Torpedo* in the California Academy of Sciences fish database (CAS, 2005).

#### ***Torpedo* sp. 2. Philippine offshore torpedo.**

**References:** None.

**Philippine material:** JPAG 252, immature male, 19 cm TL, collected Pagi-kuryente, 29 Mar 2000.

**Remarks:** Several plain coloured, long-tailed torpedo rays occur in the Indo–West Pacific and the group is in need of revision. The Philippine species is of uncertain identity.

### **Suborder Rajoidei Garman, 1913. Skates.**

Order Plagiostoma, Suborder Platosomia, "Group" Rajoidei: Garman, 1913, Mem. Mus. Comp. Zool. Harvard 36: 258, 259.

### **Family Rajidae Blainville, 1816. Skates.**

Genus or Family Raia Blainville, 1816, Bull. Sci. Soc. Philomat. Paris, (8): 107. Type genus: *Raia* Scopoli, 1777 = *Raja* Linnaeus, 1758. Several undescribed taxa occur in the Indo–West Pacific. Many of the species poorly known.

#### **Genus *Anacanthobatis* von Bonde & Swart, 1924. Smooth legskates.**

Genus *Anacanthobatis* von Bonde & Swart, 1923, Fish. Mar. Biol. Surv. Union S. Africa 3 (Spec. Rept. 5): erratum slip. Replacement name for *Leiobatis* von Bonde & Swart, 1923, Fish. Mar. Biol. Surv. Union S. Africa 3 (Spec. Rept. 5): 18. Type species: "*Anacanthobatis marmoratus* von Bonde & Swart, 1923", by subsequent designation of Fowler (1941, Bull. U.S. Natn. Mus. [100], 13: 448).

***Anacanthobatis borneensis* Chan, 1965. Borneo legskate.**

*Anacanthobatis borneensis* Chan, 1965, Japanese J. Ichthyol. 13(1/3): 47, figs. 1–2. Holotype: British Museum (Natural History), BMNH 1965.1.29.1, 317 mm TL adult male, 6°0.18'N, 109°57.4'E, South China Sea, about 435 km N. of Kuching, Sarawak, Borneo, 824–835 m.

**References:** Last & Compagno, 1999, fig.: 1465. Western Central Pacific, no Philippine records.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-05–95, 19950924, 1037–1100 m, 13°21.32–20.50'N, 124°12.26–16.50'E, off east coast of Luzon, immature or adolescent male, 399 mm TL, 229 mm DW, at CSIRO Hobart.

**Remarks:** New record for the Philippines.

**Genus *Dipturus* Rafinesque, 1810. Longnose skates.**

Genus *Dipturus* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 16. Type species: “*Raja batio*” [= *Raja batis*] Linnaeus, 1758, by original designation.

***Dipturus gigas* Ishiyama, 1958. Giant skate.**

*Raja (Tengujei) gigas* Ishiyama, 1958, J. Shimonoseki Coll. Fish. 7(2–3): 386, fig. 6W, 19W, 22W, 25W, 26W, 32W, 35W, 37W, 40W, 43W, 44W, 84W, 86. Holotype: Department of Fisheries, Faculty of Agriculture, Kyoto University, 1345 mm TL adult male, off Aichi Prefecture, Kumano-nada, Japan.

**References:** *Raja (Tengujei) gigas*: Ishiyama, 1967: 39, fig. 11, pl. 17. Japan. Ishihara, 1987: 280. USNM–137886 from off Hermanos Is., 18°32'30"N, 122°01'E, Philippines. *Raja (Dipturus) gigas*: Last & Compagno, 1999: 1454. Western Central Pacific.

**Philippine material:** None examined by the WWF elasmobranch biodiversity project.

**Remarks:** Ishihara (1987) reported the only known Philippine record of this large, western North Pacific skate.

***Dipturus tengu* (Jordan & Fowler, 1903). Goblin skate.**

*Raja tengu* Jordan & Fowler, 1903, Proc. U.S. Natn. Mus. 26: 654, fig. 8\*. Holotype: Division of Systematic Biology, Stanford University SU–12912, Matsushima Bay, Japan, according to Böhlke (1953, Stanford Ichthyol. Bull. 5:10).

**References:** *Raja (Tengujei) tengu*: Ishiyama, 1958: 377, figs. 82, 84T. Japan. Ishiyama, 1967: 30, fig. 8, pl. 14. Japan. Ishihara, 1987: 280. USNM–137885 from Boguato I., Philippines, 12°51'40"N, 123°26'15"E. *Raja (Dipturus) tengu*: Last & Compagno, 1999: 1454. Western Central Pacific.

**Philippine material:** None examined by the WWF elasmobranch biodiversity project.

**Remarks:** Ishihara (1987) reported the only known Philippine record of this western North Pacific skate.

***Dipturus* sp. 1. Philippine longnose skate.**

**References:** *Raja (Dipturus) sp. I*. Last & Compagno, 1999, fig.: 1454. Western Central Pacific, Australia, with similar form from the northern Philippines (Luzon).

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-12–95, 19950927, 760–770 m, 14°50.46–49.38'N, 123°17.30–22.33'E, female, 948 mm TL, 750 mm DW, at CSIRO Hobart. None seen by the WWF elasmobranch biodiversity project.

**Remarks:** A large skate, closely related to Weng’s skate, *Dipturus* sp. I (Last & Stevens, 1994) from Australia, and *D. springeri* (Wallace, 1967) from South Africa.

***Dipturus* sp. 2. Philippine skate.**

**References:** None.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-04–95, 19950924, 40–50 m, 12°49.19–47.23'N, 124°22.78–24.69'E, “4 Legaspi”, female, 457 mm TL, 322 mm DW, at CSIRO Hobart. None seen by the WWF elasmobranch biodiversity project.

**Remarks:** Needs to be carefully compared with other skates of the region.

***Dipturus* sp. 3. Seret’s Philippine skate.**

**References:** None.

**Philippine material:** MNHN unregistered.

**Remarks:** This species was discovered by Dr Bernard Seret and was examined by one of us (P. Last) at the MNHN, in Paris. A comparison with other Indo–West Pacific skates suggests that it is distinct.

***Dipturus* sp. 4. Tilted-thorn skate.**

**References:** None.

**Philippine material:** 7 whole, Punta Miray, Baliangao; Dipolog City Public Market; Palapala Fish Port, Cadiz City; Bukana, Sikayab, Dapitan City; Silliman Beach, Dumaguete City, BRU 147, female, 876 mm TL, 618 mm DW, March 29, 2000; BRU 096, male, 637 mm TL, 432 mm DW, April 18, 1999; JPAG 078, mature male, 666 mm TL, 450 mm DW, April 7, 1999; JPAG 091, female, 897 mm TL, 620 mm DW, April 17, 1999; MMLM 014, female, 590 mm DW, June 11, 1999; MMLM 018, female, 896 mm TL, 628 mm DW, August 17, 1999; MMLM 021, female, 805 mm TL, 580 mm DW, August 19, 1999.

**Remarks:** Medium-sized, possibly undescribed *Dipturus* with a long snout and distinctive laterally directed thorns on the mid-disc. It has a uniform greyish dorsal surface, and a mottled brownish and white ventral surface.

**Genus *Insentiraja* Yearsley & Last, 1992. Looseskin skates.**

Subgenus *Insentiraja* Yearsley & Last, 1992, Copeia 1992(3): 839 (Genus *Pavoraja* Whitley, 1939). Type species: *Pavoraja laxipella* Yearsley & Last, 1992, by original designation.

***Insentiraja subtilispinosa* (Stehmann, 1989). Philippine looseskin skate.**

*Notoraja subtilispinosa* Stehmann, 1989, Mem. Mus. Natn. Hist. Nat., Paris, Ser. A, Zool., 143: 249, fig. 1–4, 6–7. Holotype: Museum National d’Histoire Naturelle, Paris, MNHN–1985–134, 415 mm TL, 192 mm DW adolescent male, 13°53.7’N, 119° 56.3’E, South China Sea off NW Philippines, 970 m.

**References:** *Notoraja (Insentiraja) subtilispinosa*: Last & Compagno, 1999: 1460. Western Central Pacific, including northern Philippines.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-05–95, 19950924, 1037–1100 m, 13°21.32–20.50’N, 124°12.26–16.50’E, female, 552 mm TL, 290 mm DW, at CSIRO Hobart.

**Remarks:** Closely related to the Australian *Insentiraja* sp. B, these specimens are the only material in existence other than the holotype.

**Genus *Okamejei* Ishiyama, 1958.**

Subgenus *Okamejei* Ishiyama, 1958 (Genus *Raja* Linnaeus, 1758), J. Shimonoseki Coll. Fish. 7(2–3): 354. Type species: *Raja fusca* Garman, 1885, by original designation.

**?*Okamejei boesemani* (Ishihara, 1987). Black sand skate.**

*Raja (Okamejei) boesemani* Ishihara, 1987, Japanese J. Ichthyol. 34(3): 248, fig. 6. Holotype: Museum of the Tokyo University of Fisheries, MTUF–25916, 469 mm TL adult male, East China Sea, 32°15’N, 125°05’E, depth unknown.

**References:** *Raja (Okamejei) boesemani*: Last & Compagno, 1999, fig.: 1456. Western Central Pacific, north of Luzon.

**Philippine material:** None.

**Remarks:** Records of this species in the eastern South China Sea appear to be of an undescribed *Okamejei* (Philippine ocellate skate – see below) that appears to be closely related to *O. boesemani* (Last & Ishihara, in prep). The identity of a paratype of *O. boesemani* (HK 1) taken immediately north of Philippine EEZ (off Luzon) needs to be reassessed.

**?*Okamejei hollandi* (Jordan & Richardson, 1909). Yellow-spotted skate.**

*Raja hollandi* Jordan & Richardson, 1909, Mem. Carnegie Mus., 4(4): 163, pl. 64. Holotype: Field Museum of Natural History, Chicago, FMNH–52101, 412 mm TL. adult female, Takao (Kaohsiung?), Taiwan.

**References:** *Raja hollandi*: Fowler, 1941: 370. Taiwan, no Philippine records. *Raja (Okamejei) hollandi*: Ishiyama, 1958: 361, fig. 75. Japan. Ishiyama, 1967:13, fig. 3, pls. 4–5. Japan. Ishihara, 1987: 256, fig. 12. Japan to the South China Sea, no Philippine records. Last & Compagno, 1999: 1456. Western Central Pacific, no Philippine records.

**Philippine material:** None.

**Remarks:** Not mentioned by Herre (1953) and no validated records from the Philippines. Possibly in the area but more likely appears to be confined to the East China Sea.

**?*Okamejei kenojei* (Müller & Henle, 1841). Spiny-rasp skate.**

*Raja kenojei* Müller & Henle, 1841, Syst. Besch. Plagiostomen, (3): 149. Syntypes: Four specimens in the Rijksmuseum van Natuurlijke Histoire from the Nagasaki Fish Market, Japan, of which RMNH D 2499, 370 mm TL immature female (stuffed) was designated lectotype by Boeseman (1947, Zool. Meded. 28: 224). Type locality “Südwestküste von Japan—Auf dem Fischmarkt von Nagasaki.”

**References:** *Raja kenojei*: Casto de Elera, 1895: 620. Luzon, Manila, Samar, Borongan, Paragua, Puerta Princesa. Fowler, 1941: 372. Philippine records include RV *Albatross* 1488, D5388, Bagatao Island, Sorsogon Province, between Burias and Luzon, 12°51'30"N, 123°36'15"E; RV *Albatross* 1488, D5326, Dos Hermanos Island, Cagayan Province, northeast Luzon, 18°32'30"N, 122°01'E. Herre, 1953: 39. Fowler's Philippine records. *Raja fusca*: Fowler, 1941: 366. Philippine record, RV *Albatross* 8290, D5388, Bagatao Island, Sorsogon Province, between Burias and Luzon, 12°51'30"N, 123°36'15"E; Herre, 1953: 39. Fowler's Philippine record. Ishiyama, 1958: 356, figs. 57, 73, Pl. 2M. Japan. Ishiyama, 1967: 7, fig. 1, pls. 1–2. Japan. Ishihara, 1987: 260, figs. 17–18. No Philippine specimens.

**Philippine material:** None. No Philippine specimens of *Okamejei kenojei* were located on the U.S. National Museum of Natural History fish database (USNM URL, 2002).

**Remarks:** Possibly misidentification of the following species. *Okamejei kenojei* appears to be confined to the continental shelf off Japan and in the China Seas south to about Xiamen.

***Okamejei* sp. 1. Philippine ocellate skate.**

**References:** None.

**Philippine material:** 8 whole, 1 tail-less, Palapala Fish Port, Cadiz City; Pasil Fish Port I, Cebu City; Dipolog City Public Market, BRU 167, female, 525 mm TL, 340 mm DW, April 6, 2000; BRU 168, female, 480 mm TL, 315 mm DW, April 6, 2000; BRU 169, female, 475 mm TL, 313 mm DW, April 6, 2000; BRU 170, female, 495 mm TL, 335 mm DW, April 6, 2000; BRU 172, immature male, 407 mm TL, 240 mm DW, April 6, 2000; JPAG 328, female, 534 mm TL, 367 mm DW, April 13, 2000; JPAG 054, female, 490 mm TL, 325 mm DW, April 8, 1999; JPAG 055, female, 524 mm TL, 334 mm DW, April 8, 1999; 1 tail-less BRU 171, female, unknown TL, 310 mm DW, April 6, 2000.

**Remarks:** Closely related to the North West Pacific *O. boesemani* from which can be distinguished based on colour and squamation. A large black, mucous-imbedded ocellus on the mid-disc is removed when specimens are washed. Possibly endemic to the Philippines. Another closely related species occurs in the South China Sea.

**Suborder Myliobatoidei Fowler, 1941. Stingrays.**

Order Rajae, [group] Myliobatoidei Fowler, 1941, Bull. U.S. Natn. Mus.(100) 13: 290.

**Family Plesiobatididae Nishida, 1990. Giant stingarees.**

Family Plesiobatididae Nishida, 1990, Mem. Fac. Fish. Hokkaido U. 37(1.2): 97, 98. Type genus: *Plesiobatis* Nishida, 1990. Sometimes spelled Plesiobatidae.

**Genus *Plesiobatis* Nishida, 1990. Giant stingarees.**

Genus *Plesiobatis* Nishida, 1990, Mem. Fac. Fish. Hokkaido U. 37(1.2): 97, 98. Type species: *Urotrygon daviesi* Wallace, 1967, by original designation.



***Plesiobatis daviesi* (Wallace, 1967). Giant stingaree.**

*Urotrygon daviesi* Wallace, 1967b, S. African Ass. Mar. Biol. Res., Oceanogr. Res. Inst., Invest. Rept. (16): 8, figs. 3–4. Holotype: J.L.B. Smith Institute of Ichthyology, RUSI-7861 (ex Oceanographic Research Institute, Durban, ORI B865), 922 mm DW, 1717 mm TL, off Limpopo River mouth, Mozambique, ca. 25°25'S, 33°35'E, 430–439 m.

**References:** Last & Stevens, 1994: 420, fig., pl. 73. Distribution, no Philippine records. Compagno & Last, 1999: 1467, fig. Western Central Pacific, northern Luzon (map).

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-14-95, 19950927, 435–451 m, 14°41.07–42.42'N, 123°24.12–21.42'E, female, 507 mm TL, 288 mm DW. 2 whole, 1 pair claspers, Silliman Beach, Dumaguete City; Isla Verde, Pulu, Dapitan City, JPAG 212a, mature male, August 18, 1999; JPAG 154, mature male, 636 mm DW, April 9, 1999; JPAG 062A, male, 1,550 mm TL, 800 mm DW, April 9, 1999; MMLM 008, female, 537 mm TL, 650 mm DW, May 9, 1999.

**Remarks:** Widespread species first listed from the northern Philippines by Compagno & Last (1999, map) based on the TFRI material. WWF material confirms its existence in the southern Philippines.

**Family Hexatrygonidae Heemstra & Smith, 1980. Sixgill stingrays.**

Family Hexatrygonidae Heemstra & Smith, 1980, Ichth. Bull. J.L.B. Smith Inst. Ichthyol. (43): 1. Type genus: *Hexatrygon* Heemstra & Smith, 1980.

**Genus *Hexatrygon* Heemstra & Smith, 1980. Sixgill stingrays.**

Genus *Hexatrygon* Heemstra & Smith, 1980, Ichth. Bull. J.L.B. Smith Inst. Ichthyol. (43): 1. Type species: *Hexatrygon bickelli* Heemstra & Smith, 1980, by original designation.

***Hexatrygon bickelli* Heemstra & Smith, 1980. Sixgill stingray.**

*Hexatrygon bickelli* Heemstra & Smith, 1980, Ichth. Bull. J.L.B. Smith Inst. Ichthyol. (43): 6, figs. 1–13, 15. Holotype: J.L.B. Smith Institute of Ichthyology, RUSI-997, 103 cm TL, 500 mm DW immature or near-adolescent female, washed up on beach at Port Elizabeth, South Africa, ca. 33°59.5'S, 25°40.7'E.

*Hexatrematobatis longirostrum* Zhu & Meng, in Zhu, Meng, Hu, & Li, 1981, Oceanol. Limnol. Sinica, 12(2): 111, fig. 4. Holotype: South China Sea Fisheries Research Institute, SCSFRI-00072, 633 mm TL immature male, South China Sea, in block 112–114°E, 18.5–21°N, 350–1000 m.

*Hexatrygon yangi* Shen & Liu, 1984, Act. Oceanogr. Taiwanica, (15): 201. Holotype: National Taiwan University Museum, NTUM-06100, 1040 mm TL, 545 mm DW subadult male, Tung-Kang fish market, SW coast of Taiwan, ca. 22°28'N, 120°26'E, 500 m.

*Hexatrygon taiwanensis* Shen, 1986a, J. Taiwan Mus. 39(1): 175, fig. 1–5. Holotype: National Taiwan University Museum, NTUM-0655, 582 mm TL, 353 mm DW juvenile female, Tung-Kang fish market, SW coast of Taiwan, ca. 22°28'N, 120°26'E, 370 m.

*Hexatrygon brevirostra* Shen, 1986b, J. Taiwan Mus. 39(2): 106, fig. 1–3. Holotype: National Taiwan University Museum, NTUM-06597, 621 mm TL, 365 mm DW juvenile (?) female, Tung-Kang fish market, SW coast of Taiwan, 22°28'N, 120°26'E, 362 m.

**References:** *Hexatrygon* sp. A: Last & Stevens, 1994: 445, fig., pl. 64. Distribution off Australia, no Philippine records. *Hexatrygon bickelli*: Compagno & Last, 1999: 1477, fig. Western Central Pacific, including Philippines.

**Philippine material:** Taiwan Fisheries Research Institute RV *Fishery Researcher 1* sta. FR1-PHI-13-95, 19950927, 648–660 m, 14°18.30–47.35'N, 123°21.46–25.14'E, off east coast of Luzon, immature male, 710 mm TL, 388 mm DW, catalogued as AMS-I.36463-002, Australian Museum, Sydney.

**Remarks:** Various names (above) have been applied to the western Pacific *Hexatrygon* but these are now widely considered to be conspecific with *H. bickelli*.

## Family Dasyatidae Jordan, 1888. Stingrays.

Family Dasyatidae Jordan, 1888, Man. Vert. Eastern U.S., ed. 5: 15. Type genus: *Dasyatis* Rafinesque, 1810.

### Genus *Dasyatis* Rafinesque, 1810. Fringe-tail stingrays.

Genus *Dasyatis* Rafinesque, 1810, Caratt. gen. sp. anim. piant. Sicilia, Palermo, pt. 1: 16. Type species: *Dasyatis ujo* Rafinesque, 1810, by monotypy, equals *Raja pastinaca* Linnaeus, 1758.

### *Dasyatis* cf. *akajei* (Bürger in Müller & Henle, 1841). Philippine red stingray.

*Trygon Akajei* Bürger in Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 165, pl. 54, fig. 1. Lectotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH 4255a, 146 mm DW, southwest coast of Japan, designated by Boeseman (1947, Zool. Meded. Leiden 28: 227). Taken from a Bürger manuscript name but attributed to Müller & Henle ("*Trygon Akajei* N.").

**References:** *Dasyatis akajei*: Fowler, 1941: 428. No Philippine records. Nakaya & Nishida, 1990, 333, fig. 6. Japan, Korea, Taiwan and China, no Philippine specimens. Last & Compagno, 1998: 1498, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 1 head, 10 tail-less, 8 whole, Bacolod City Fish Port; Dipolog Public Market; Dumaguete City Public Market; Palapala fish port and Public Market, Cadiz City; Punta Miray, Baliangao; Sangki, Basay, JPAG 012, male, unknown DW, January 29, 1999; JPAG 040, female, 436 mm DW, February 0, 1999; JPAG 041, female, 446 mm DW, February 20, 1999; MMLM 023, male, 353 mm DW, February 1, 2000; BRU 162, female, 472 mm DW, April 6, 2000; BRU 179, female, 600 mm DW, April 7, 2000; BRU 173, female, 252 mm DW, April 7, 2000; BRU 174, immature male, 280 mm DW, April 7, 2000; BRU 176, female, 285 mm DW, April 7, 2000; BRU 178, mature male, 335 mm DW, April 7, 2000; BRU 143, female, 347, mm DW, March 28, 2000; JPAG 051, female, 712 mm TL, 368 mm DW, April 5, 1999; JPAG 052, female, 731 mm TL, 374 mm DW, April 5, 1999; BRU 164, female, 903 mm TL, 495 mm DW, April 6, 2000; BRU 161, female, 535 mm TL, 352 mm DW, April 6, 2000; BRU 163, mature male, 657 mm TL, 378 mm DW, April 6, 2000; BRU 177, mature male, 675 mm TL, 380 mm DW, April 7, 2000; BRU 097, female, 788 mm TL, 402 mm DW, April 18, 1999; BRU 175, female, 215 mm TL, 250 mm DW, April 7, 2000.

**Remarks:** *Dasyatis akajei* was not mentioned in Herre's (1953) checklist. Philippine form closely resembles *D. akajei* from Japan and Taiwan but differs markedly in denticle morphology. Its relationship to similar rays in the South China Sea needs to be established.

### ?*Dasyatis bennettii* (Müller & Henle, 1841). Bennett's stingray.

*Trygon Bennettii* Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 160, pl. 53. Syntypes: Two in British Museum (Natural History) including one from China and a second about 17" long from Trinidad (possibly *Dasyatis sabina* from its tail folds?); a third specimen in the Museum National d'Histoire Naturelle, Paris 18" wide. Eschmeyer (1998, Catalog of Fishes, CD-ROM) lists BMNH 1953.8.10.13 (1) from China as a surviving syntype, but the MNHN specimen was not found.

**References:** *Trygon bennettii*: Casto de Elera, 1895: 620. Manila. *Dasyatis bennetti*: Fowler, 1941: 413. Casto de Elera's record, but no specimens. Nishida & Nakaya, 1990, 334, fig. 7. Indo-West Pacific, no Philippine specimens. Last & Compagno, 1998: 1499, fig. Western Central Pacific, including Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) didn't include this species in his checklist and its status in Philippine seas needs to be verified. Possibly a misidentification of the preceding species.

### *Dasyatis kuhlii* (Müller & Henle, 1841). Blue-spotted maskray.

*Trygon Kuhlii* Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 164, pl. 51. Syntypes: One stuffed example in Rijksmuseum van Natuurlijke Historie, Leiden, RMNH no number; and two alcohol specimens in Museum National d'Histoire Naturelle, Paris, MNHN 2440, from Vanikoro, collected by Quoy & Gaimard, MNHN A.7931 dried specimen from New Guinea; type data in part from Eschmeyer (1998: Catalog of Fishes, CD-ROM).

**References:** *Dasyatis kuhlii*: Roxas & Martin, 1937: 16. Philippines. Fowler, 1941: 424. Records from Dumaguete, Manila, Capiz, Cebu, Sitankai. Herre, 1953: 43. Records from Manila; Cebu mkt, Cebu; Zamboanga, Zamboanga Province, Mindanao; Gulf of Lingayen; Divisoria and Quiapo markets, Manila; Cavite

market; Batangas market, Batangas Province, San Miguel Bay, Luzon; Siquijor Is.; Butuan Bay, Agusan Province, Panguil Bay, Lanao Province, Mindanao; Estancia, Iloilo Province, Panay; Dumaguete, Oriental Negros; Capiz, Capiz Prov; Sitankai, Sulu Province; SW. Samar. Specimens in Philippine Bureau of Science, Ateneo de Manila Museum, and University of Santo Tomas Museum. Nakaya & Nishida, 1990, 334, fig. 8. Indo–West Pacific, no Philippine specimens. Last & Stevens, 1994: 391, fig., pl. 71. Distribution off Australia, no Philippine records. Last & Compagno, 1999: 1484, fig. Western Central Pacific, including Philippines.

**Philippine material:** A specimen at Bolinao Market, October 9, 1995, this not saved (L. Compagno); Cebu market, Lapu-Lapu, Pasil & Carbon, Olongo Is., 25–27 September, 1995, female, 580 mm TL, 281 mm DW, 237 DL (L. Compagno); Manila market, 19–30 September, 1995, adult male, 336 mm DW (L. Compagno); Navotas Market, 5 Oct. 1995, 168 mm DW, 132 mm DL, 322 mm TL immature male (L. Compagno); specimen saved and photographed by Jack Randall from Navotas Market, October 3, 1995 (L. Compagno); two big specimens seen at Bolinao Market, evening, October 7, 1995, these not saved (L. Compagno). 2 whole, 1 tailless, Bayawan Public Market; Iloilo City Fishing Port, BRU 001, female, 785 mm TL, 364 mm DW, January 17, 1999; BRU 029, female, 365 mm DW, February 13, 1999; JPAG 002, female, 456 mm TL, 357 mm DW, January 17, 1999.

**Remarks:** Freshwater stingrays in Lake Naujan, Philippines, and at Moncayo on the upper Agusan River were thought by Herre (1958) to be either this species or *Himantura uarnak* but were not necessarily either of these species. No recent reports have been made of stingrays from freshwater habitats in the Philippines. *Dasyatis kuhlii*, which occurs as several morphs in the Indo–Pacific, is probably a species complex requiring further study.

***Dasyatis zugei* (Bürger in Müller & Henle, 1841). Pale-edge stingray.**

*Trygon Zugei* Bürger in Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 165, pl. 54. Syntypes: two in Institut für Spezielle Zoologie und Zoologisches Museum, Berlin; two stuffed specimens from Japan in Rijksmuseum van Natuurlijke Historie, Leiden; and four in Museum National d’Histoire Naturelle, Paris, from Pondicherry and Macao. Lectotype: Museum National d’Histoire Naturelle, MNHN 1987–152, 316 mm TL, 137 mm DW immature female, Macao, China; designated by Nishida & Nakaya, 1988, Japanese J. Ichthyol. 35(2): 121.

**References:** *Dasyatis zugei*: Fowler, 1941: 429. No Philippine specimens. Herre, 1953: 47. Gulf of Lingayen and Balayan Bay, Batangas Province, Luzon; Malampaya Sound, Palawan; South Ubian and Sitankai, Sulu. Province Specimens in Philippine Bureau of Science and Ateneo de Manila Museum. Nakaya & Nishida, 1990, 335, fig. 10. Indo–West Pacific, no Philippine specimens. Last & Compagno, 1999: 1501, fig. Western Central Pacific, including Philippines.

**Philippine material:** None examined.

**Remarks:** Widespread in the Indo–West Pacific but was surprisingly absent from fish markets of the southern Philippines.

***Dasyatis* sp. 1. Adon’s maskray.**

**Philippine material:** 1 tail-less, Bacolod City Public Market, JPAG 037, female, unknown TL, 329 mm DW, February 19, 1999.

**Remarks:** No other member of the *Dasyatis kuhlii* group has a brown-blotched dorsal colour pattern; other species have blue spots (*D. kuhlii*), reticulations (*D. leylandi* Last, 1987, from western Australia), black spots (*D. leylandi* from eastern Australia), or are plain (*D. annotata* Last, 1987, from northern Australia). Known from a single specimen with its tail removed (from just forward of the spine) so additional material is needed before its validity as a Philippine endemic can be determined.

**Genus *Himantura* Müller & Henle, 1837. Whiprays.**

Genus *Himantura* Müller & Henle, 1837, Ber. K. preuss. Akad. wiss. Berlin, 2: 117. Müller & Henle, 1837, Arch. Naturg. 3: 400. Type species. *Raja uarnak* Forsskål, 1775, by subsequent designation of Jordan & Evermann (1896, Bull. U.S. Natl. Mus. [47]: 82).

**?*Himantura bleekeri* (Blyth, 1860). Longtail whipray.**

*Trygon bleekeri* Blyth, 1860, J. Asiatic Soc. Bengal, 29: 41. Syntypes: Two specimens mentioned, disc length 25" (64 cm) and tail length 72" (183 cm), and disc length 15" (38 cm) and tail length 56" (142 cm), obtained in Calcutta fish markets, Bengal. Eschmeyer (1998, Catalog of Fishes, CD-ROM) mentions one of these as British Museum (Natural History), BMNH 1892.6.17.15.

**References:** *Dasyatis bleekeri*: Fowler, 1941: 410. No Philippine records. Herre, 1953: 42. Malampaya Sound, Palawan, collected by *Spencer F. Baird*, Oct. 1947.

**Philippine material:** None examined.

**Remarks:** Not collected from local fish markets but common in nearby Borneo. Appears to be a junior synonym of *H. uarnacoides* (Manjaji, 2004).

***Himantura fai* Jordan & Seale, 1906. Pink whipray.**

*Himantura fai* Jordan & Seale, 1906, U.S. Dept. Commerce Labor, Bull. Bur. Fish. 1905 (pub. 1906) 25: 184, fig. 2. Holotype: U.S. National Museum of Natural History, USNM-51712, female 47" (119 cm) TL, DW from illustration of type about 17" (44 cm); from Apia, Samoa, 13°48'S, 171°45'W. No other material.

**References:** *Dasyatis gerrardi*: Fowler, 1941: 409. *Himantura fai* listed as a synonym, Samoa, not from Philippines. *Himantura fai*: Last & Stevens, 1994: 400, fig. pl. 69. Distribution, no Philippine records. Last & Compagno, 1999: 1486, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 1 tail-less, Palapala fish port, Cadiz City, BRU 083, immature male, 510 mm DW, April 16, 1999.

**Remarks:** Not mentioned by Herre (1953) in his checklist. This is a very common and widespread Indo-Pacific ray, but it was not commonly collected from regional fishmarkets during the WWF project.

**?*Himantura gerrardi* (Gray, 1851). Sharpnose whipray.**

*Trygon gerrardi* Gray, 1851, List Fish British Mus., Pt. 1, Chondropterygii, British Mus. (Nat. Hist.): 116. Syntypes: British Museum (Natural History), BMNH-1843.5.19.1 (1, dry), BMNH-1846.11.18.49 (1, dry), stuffed specimens from India from Mr. Argent's collection according to Gray. Catalog numbers from Eschmeyer (1998, CD-ROM), who also lists Rijksmuseum van Natuurlijke Historie, Leiden, RMNH 7442 (3) as syntypes (not listed in Gray's original account).

**References:** *Trygon gerrardi*: Casto de Elera, 1895: 620. Luzon, Cavite, Santa Cruz. *Dasyatis gerrardi* Fowler, 1941: 409. Casto de Elera's record but no new material. Last & Compagno, 1999: 1487, fig. Western Central Pacific, including Philippines.

**Philippine material:** None.

**Remarks:** Not mentioned by Herre (1953) in his checklist and not collected from local fish markets. Very commonly landed by trawlers in nearby Borneo.

***Himantura granulata* (Macleay, 1882). Mangrove whipray.**

*Trygon granulata* Macleay, 1882, Proc. Linnæan Soc. New South Wales (1883), 7(4): 598, published Oct. 25, 1882. Holotype: Only specimen mentioned was 330 mm (13") DW, sex not stated and not assigned to a collection. Type locality New Guinea, no specific locality. Listed as Australian Museum Sydney, AMS I.9763 by Eschmeyer (1998, Catalog of Fishes, CD-ROM).

*Trygon ponapensis* Günther, 1910, Fische Südsee: 493, pl. 180. Holotype: British Museum (Natural History) BMNH 1879.5.22.105, Kabary, Ponape, Caroline Islands, according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Dasyatis granulatus*: Fowler, 1941: 437. New Guinea and Vanikoro, no Philippine records. *Dasyatis ponapensis*: Fowler, 1941: 432. Ponape, Caroline Islands. *Himantura granulata*: Last & Stevens, 1994: 402, fig. pl. 69. Distribution, no Philippine records. Last & Compagno, 1999: 1488, fig. Western Central Pacific, no Philippine records.

**Philippine material:** Photos, Pasil Fish Port I, Cebu City, JPAG 297, female, April 11, 2000; 1 tail-less, Puerto Princesa Public Market, JPAG 207, female, 304 mm DW, March 11, 2000.

**Remarks:** Not mentioned by Herre (1953) in his checklist. Common and widespread Indo-Pacific ray. Not collected from regional fishmarkets during the project.

**?*Himantura imbricata* (Bloch & Schneider, 1801). Scaly whipray.**

*Raja imbricata* Bloch & Schneider, 1801, Syst. Ichthyol.: 366, 553. Holotype: Universität Humboldt, Museum für Naturkunde, Berlin, ZMB 7585 (dry), according to Paepke & Schmidt (1988, Mitt. Zool. Mus. Berlin 64 [1]: 177).

**References:** *Dasyatis imbricatus*: Fowler, 1941: 434. No Philippines records. Herre, 1953: 42. Nominal record from Manila Bay, *Theodore N. Gill* station in 57 m *Himantura imbricata*: Last & Compagno, 1999: 1502, fig. Western Central Pacific, no Philippine records.

**Philippine material:** None.

**Remarks:** This species is a frequent misidentification of *Himantura walga* in the Indo–West Pacific. Its occurrence in the Philippines needs confirmation.

***Himantura jenkinsii* (Annandale, 1909). Golden whipray.**

*Trygon jenkinsii* Annandale, 1909, Mem. Indian Mus. 2(1): 28, fig. 4. Holotype: Zoological Survey of India, F–2474/1, 1038 cm DW adult male, Ganjam Coast, India, 42–49 m.

**References:** *Dasyatis jenkinsii*: Fowler, 1941: 432. India, no Philippine records. *Himantura jenkinsii*: Last & Stevens, 1994: 405, fig. pl. 68. Distribution, no Philippine records. Last & Compagno, 1999: 1489, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 2 tail-less, 3 whole, Pasil Fish Port, Suba and Pasil Fish Market, Cebu City; Puerto Princesa Public Market, Matahimik, Puerto Princesa City; Banago Market, Bacolod City, JPAG 136, female, 421 mm DW, April 22, 1999; JPAG 213b, immature male, 242 mm DW, March 14, 2000; BRU 109, female, 852 mm TL, 435 mm DW, March 11, 2000; BRU 116, immature male, 498 mm TL, 230 mm DW, March 12, 2000; JPAG 148, female, 1,107 mm TL, 559 mm DW, April 23, 1999.

**Remarks:** Not mentioned in Herre's (1953) checklist. A distinctive ray, widely distributed in the region and hereby first recorded from the Philippines.

***Himantura uarnak* (Forsskal, 1775). Spotted whipray.**

*Raja uarnak* Forsskal, 1775, Descript. Animal.: VIII, 18. Lectotype: Naturmuseums Senckenberg, Frankfurt, SMF 2540, stuffed; also two paralectotypes, SMF 2543 and 2557, both stuffed, from the Red Sea.

**References:** *Dasyatis uarnak*: Roxas & Martin, 1937: 17. Philippines. Fowler, 1941: 405. Philippine specimens from Sorsogon Province; Port San Vicente, Cagayan Province; Abuyog, Leyte; mouth of Malayampaya R., Malampaya Sound, Palawan. Herre, 1953: 45. Specimens in Philippine Bureau of Science, Ateneo de Manila Museum, and University of Santo Tomas Museum. Records from Gulf of Lingayen; Manila Bay; Cavite, Cavite Province, Batangas Bay, Luzon; Cebu, Cebu Province; Cotabato Province and Lianga Bay, Surigao Province, Mindanao; Siquijor Is.; Basey, Samar; Jolo and Sitankai, Sulu Province. *Himantura uarnak*: Last & Stevens, 1994: 406, fig. pl. 68. Distribution, including Philippines. Last & Compagno, 1999: 1491, fig. Western Central Pacific, including Philippines.

**Philippine material:** Spotted form from Manila market, 19–30 September, 1995, immature male, 279 mm DW (L. Compagno). Spotted form, Navotas Market, 5 Oct. 1995, 372 mm DW, 338 mm DL, 1350 mm TL immature female. 2 heads, 1 right half of head, 2 tail-less, 3 whole, Bacolod Central Public Market; Bacolod Public Market, Libertad, Bacolod City; Iloilo City Central Public Market; New Guinlo and San Jose Public Market, Taytay; Puerto Princesa Public Market; Palapala Fish Port, Cadiz City; Silliman Beach, Dumaguete City, BRU 026, male, 356 mm DW, February 12, 1999; BRU 027, male, February 12, 1999; JPAG 201, unknown sex, unknown TL, July 1, 1999; JPAG 202, unknown sex, unknown TL, July 1, 1999; JPAG 200, unknown sex, unknown TL, June 26, 1999; JPAG 023, male, unknown TL, February 12, 1999; JPAG 036, immature male, 287 mm DW, February 18, 1999; JPAG 035, immature male, 444 mm DW, February 19, 1999; BRU 111, female, 471 mm DW, March 12, 2000; BRU 113, immature male, 383 mm DW, March 12, 2000; BRU 114, immature male, 284 mm DW, March 12, 2000; BRU 084, female, 403 mm DW, April 16, 1999; JPAG 218, immature male, 423 mm DW, March 14, 2000; BRU 112, immature male, 364 mm DW, March 12, 2000; BRU 115, female, 295 mm DW, March 12, 2000; BRU 034, immature male, 1,510 mm TL, 457.5 mm DW, February 21, 1999; BRU 035, female, 1,413 mm TL, 406 mm DW, February 21, 1999; MMLM 020, immature male, 1,071 mm TL, 294 mm DW, August 18, 1999.

**Remarks:** Freshwater stingrays in Lake Naujan, Philippines, and at Moncayo on the upper Agusan River were thought by Herre (1958) to be either this species or *Dasyatis kuhlii*. *Himantura uarnak* is widespread in the

Indo–West Pacific as well as in the Philippines but is rarely taken from freshwater and another species may be involved.

***Himantura cf. undulata* (Bleeker, 1852). Leopard whipray.**

*Trygon undulata* Bleeker, 1852, Verh. Batav. Genoots. Kunst. Wet. (Plagiost.) 24: 70. Syntypes: Three specimens, including one male, 270–320 lines (22.5"–26.6" or 572–677 mm) wide, from Batavia (Jakarta) and Samarang, in the sea. According to Eschmeyer (1998, Catalog of Fishes, CD-ROM), surviving syntypes are British Museum (Natural History), BMNH 1867.11.28.156 (1) Batavia, Rijksmuseum van Natuurlijke Historie, Leiden, RMNH 7440 (1 of 2). Possible syntype figured by Bleeker (1983, Atlas Ichthyol., pl. 562).

**References:** *Dasyatis uarnak*: Fowler, 1941: 407, in part. *Trygon undulata* a synonym. *Himantura undulata*: Last & Stevens, 1994: 408, fig. pl. 68. Distribution, no Philippine records. Last & Compagno, 1999: 1492, fig. Western Central Pacific, including Philippines.

**Philippine material:** Photos, Pasil Fish Port I, Cebu City, JPAG 321, female, unknown TL, 1300 mm DW, April 13, 2000.

**Remarks:** Conspecific with *Himantura undulata* (*sensu* Last & Stevens, 1994) and considered to be undescribed by Manjaji (2004). Confusion exists between this species and the more boldly reticulated *H. fava* (Annandale, 1909), which is smaller, has a more rounded disc, and occurs off India, Indonesia and the Gulf of Thailand.

***Himantura walga* (Müller & Henle, 1841). Dwarf whipray.**

*Trygon Walga* Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 159, pl. 51, fig. 1. Syntypes: According to Eschmeyer (1998, Catalog of Fishes, CD-ROM), these include British Museum (Natural History), BMNH (1); Museum National d'Histoire Naturelle, Paris, MNHN (4), MNHN 2337 (1) Red Sea, MNHN 2431 (1) Ganges; Rijksmuseum van Natuurlijke Historie, Leiden, RMNH (3).

**References:** *Dasyatis imbricatus*: Fowler, 1941: 435. *Trygon walga* a synonym. Herre, 1953: 42. Nominal record of *H. walga* from an old specimen in Ateneo de Manila Museum, stuffed, from Manila Bay, Luzon. *Himantura walga*: Last & Compagno, 1999: 1493, fig. Western Central Pacific, no Philippine records.

**Philippine material:** None.

**Remarks:** Small ray, widely distributed in the region and particularly common in the South China Sea. Not observed during WWF market surveys.

**Genus *Pastinachus* Rüppell, 1829. Cowtail stingrays.**

Subgenus *Pastinachus* Rüppell, 1829 (Genus *Trigon* Adanson), Atlas Reise nördlich. Afrika. Fische rothen Meeres (1828–1830): 51, note \*, in part. Three species apparently assigned to this 'group' or subgenus within *Trigon* Adanson *T. lymma*, *T. forskaelii*, and *T. sephen*, from the Red Sea, but there was no indication that *Pastinachus* was restricted to these species and there was no type designation. Rüppell (1837, Neue Wirbelth. Fauna Abyssinien gehör., Fische rothen Meeres (1835–1838): 69) later raised this taxon to genus and restricted it by excluding the three species originally included in it; the sole species assigned to it was *Pastinachus uarnak* Rüppell, 1837 (= *Raja uarnak* Forsskål, 1775). Garman, 1913 (Mem. Mus. Comp. Zool. Harvard, 36: 8, 375, 381) revived *Pastinachus* Rüppell, 1829 as a subgenus of *Dasybatus* (= *Dasyatis*), and designated a type species, *Dasybatus sephen* (= *Raja sephen* Forskæl, 1775). This can be construed as a subsequent designation of a type for *Pastinachus* Rüppell, 1829.

***Pastinachus cf. sephen* (Forsskål, 1775). Cowtail stingray.**

*Raja sephen* Forsskål, 1775, Descript. Animal.: 17, viii. No types known according to Eschmeyer (1998, CD-ROM), type localities Jidda, Saudi Arabia and Luhaiya, Yemen, Red Sea.

**References:** *Dasyatis sephen*: Roxas & Martin, 1937: 16. Philippines. Fowler, 1941: 415. Records from Orion, Bolalo Bay, Catbalogan, Sorsogon market, Luzon. Herre, 1953: 45. Numerous records from Manila Bay; Puerto Princesa, Palawan; Mangarin, Mindoro; Catbalogan, Samar; Surigao, Surigao Province; Dapitan and Zamboanga, Zamboanga Province, Mindanao; Jolo and Sitankai, Sulu. Province; also Herre and Kauffman's record from Guimaras, between Guimaras Island and Negros, in 22 m, caught by the motorship *Theodore N. Gill*. Nakaya & Nishida, 1990, 330, fig. 3. Indo–West Pacific, no Philippine specimens. *Pastinachus sephen*: Last & Stevens, 1994: 409, fig. pl. 70. Distribution, including Philippines. Last & Compagno, 1999: 1494, fig. Western Central Pacific, including Philippines.

**Philippine material:** 1 whole, 1 tail-less, right clasper and tail, Pasil Fish Market 1, Cebu City, JPAG 167, female, 732 mm TL, 266 mm DW, April 20, 1999; JPAG 178, male, unknown TL, 954 mm DW, May 27, 1999; JPAG 190, mature male, unknown TL, unknown DW, May 18, 1999.

**Remarks:** Taxonomy of this genus is confused and several species of *Pastinachus* occur in the Indo–West Pacific. The group is under review by Last, Manjaji and Yearsley.

**Genus *Taeniura* Müller & Henle, 1837. Ribbontail stingrays.**

Genus *Taeniura* Müller & Henle, 1837a, Ber. K. preuss. Akad. wiss. Berlin, 2: 117. Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 171. Type species: *Trygon ornatus* Gray, 1832 by monotypy, equals *Raja lymma* Forsskål, 1775.

***Taeniura lymma* (Forsskål, 1775). Blue-spotted ribbontail ray.**

*Raja lymma* Forsskål, 1775, Descript. Animal.: 17, viii. No types known according to Eschmeyer (1998, CD-ROM), type locality Luhaiya, Yemen, Red Sea.

*Trygon ornatus* Gray, 1832, Illus. Indian Zool., v. 1, Pl. 99. Illustration only, no types according to Eschmeyer (1998, CD-ROM), Singapore.

**References:** *Taeniura lymma*: Roxas & Martin, 1937: 16. Philippines. Fowler, 1941: 398. Records from Sitanki, Jolo, Cebu, Tampoana Is, Ulugan Bay, Palawan. Herre, 1953: 48. Cebu, Cebu Province; Dapitan and Zamboanga, Zamboanga Province; Tubigan Is., Siasi market, Tandubas Is., Sibutu, and Sitankai Is., Sulu Province; Balabac. Specimens in Philippine Bureau of Science and Ateneo de Manila Museum. Last & Stevens, 1994: 411, fig. pl. 70. Distribution, including Philippines. Last & Compagno, 1999: 1495, fig. Western Central Pacific, including Philippines.

**Philippine material:** Manila market, 19–30 September, 1995, adolescent male, 208 mm DW (L. Compagno). 4 tail-less, 3 whole, Iloilo City Fish Port and Central Market; Lalao, San Juan and Olo, Siquijor; Malabuhan, Siaton; Salag Daku, Buenavista, Guimaras, BRU 028, mature male, unknown TL, 255 mm DW, February 13, 1999; JPAG 025, mature male, unknown TL, 234 mm DW, February 23, 1999; JPAG 026, female, unknown TL, 283 mm DW, February 13, 1999; RSE 007, mature male, unknown TL, 264 mm DW, March 11, 1999; BRU 015, immature male, 614 mm TL, 213.5 mm DW, January 30, 1999; JPAG 033, female, 711 mm TL, 271 mm DW, February 14, 1999; RSE 008, female, 825 mm TL, 304 mm DW, March 22, 1999.

**Remarks:** Dominant stingray found on coral reefs. Commonly landed in markets.

***Taeniura meyeni* Müller & Henle, 1841. Round ribbontail ray.**

*Taeniura meyeni* Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 172, pl. 55. Syntypes: Museum National d'Histoire Naturelle, MNHN 2428 (1), Universität Humboldt, Museum für Naturkunde, Berlin, ZMB 4660 (1), according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

*Taeniura melanospilos* Bleeker, 1853, Natuurkd. Tijdschr. Neder. Indië, 4: 513. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH 7453 Jakarta (Batavia), Java, Indonesia according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Taeniura lymma*: Fowler, 1941: 399. *T. melanospilos* in synonymy, no Philippine records. *Taeniura meyeni*: Fowler, 1941: 401. No Philippine records. Last & Stevens, 1994: 412, fig. pl. 70. Distribution, including Philippines. Last & Compagno, 1999: 1496, fig. Western Central Pacific, including Philippines.

**Philippine material:** 1 whole, 1 tailless, Pasil Fish Port 1 and Market, Cebu City, JPAG 330, female, 595 mm TL, 313 mm DW, April 13, 2000; JPAG 138, immature male, 518 mm DW, April 20, 1999.

**Remarks:** Last & Stevens (1994) include the Philippines in the distributional range of this species. Probably more common than landings suggest.

**Genus *Urogymnus* Müller & Henle, 1837. Porcupine rays.**

Genus *Urogymnus* Müller & Henle, 1837b, Arch. Naturgeschichte 3: 434. Replacement name for genus *Gymnura* Müller & Henle, 1837a, Ber. K. preuss. Akad. wiss. Berlin, 2: 117; type species *Raja asperrimus* Bloch & Schneider, 1801 by monotypy. Junior homonym of *Gymnura* van Hasselt, 1823. *Urogymnus* as a replacement name takes the same type species as *Gymnura* Müller & Henle, 1837

***Urogymnus asperrimus* (Bloch & Schneider, 1801). Porcupine ray.**

*Raja asperrimus* Bloch & Schneider, 1801, Syst. Ichthyol.: 367. Holotype: Universität Humboldt, Museum für Naturkunde, Berlin, ZMB 7836 (dry skin, partial specimen), Bombay, India, according to Paepke & Schmidt (1988, Mitt. Zool. Mus. Berlin 64 [1]: 177).

*Raja africanus* Bloch & Schneider, 1801, Syst. Ichthyol.: 367. Holotype: Universität Humboldt, Museum für Naturkunde, Berlin, ZMB 7837 (dry skin, partial specimen), Bombay, India, according to Paepke & Schmidt (1988, Mitt. Zool. Mus. Berlin 64 [1]: 177).

**References:** *Urogymnus africanus*: Fowler, 1941: 438. Extralimital records. Herre, 1953: 49. Manila market; Cavite mkt, Cavite Province, and Manila Bay, Luzon; Malampaya Sound and Brooke's Point, Palawan; Balabac Is.; Bantayan Is.; Dapitan, Zamboanga Province, Mindanao; Jolo, Pearl Bank, Cagayan Sulu Is. and Sitankai, Sulu Province. *Urogymnus asperrimus*: Last & Stevens, 1994: 414, fig, pl. 70. Distribution, Philippines questionable. Last & Compagno, 1999: 1497, fig. Western Central Pacific, including Philippines.

**Philippine material:** 1 whole, claspers, Pasil Fish Market 1, Cebu City, JPAG 170, female, unknown TL, 690 mm DW, May 18, 1999; JPAG 191, mature male, unknown TL, unknown DW, May 18, 1999.

**Remarks:** Apparently uncommon, landed only occasionally, possibly declining in numbers in parts of the South China Sea (Gulf of Thailand).

**Family Gymnuridae Fowler, 1934. Butterfly rays.**

Subfamily Gymnurinae Fowler, 1934 (Family Dasyatiidae), Proc. Acad. Nat. Sci. Philadelphia, 85: 241. Type genus: *Gymnura* Kuhl in van Hasselt, 1823.

**Genus *Aetoplatea* Valenciennes, in Müller & Henle, 1841. Finned butterfly rays.**

Genus *Aetoplatea* Valenciennes, in Müller & Henle, 1841, Syst. Besch. Plagiost. (3): 175. Type species: *Aetoplatea tentaculata* Valenciennes, in Müller & Henle, 1841, by monotypy. This genus is little-distinguished from *Gymnura* and may be a junior synonym.

***Aetoplatea zonurus* Bleeker, 1852. Zonetail butterfly ray.**

*Aetoplatea zonurus* Bleeker, 1852, Verh. Batav. Genoots. Kunst. Wet. (Plagiost.) 24: 79. Possible syntype: British Museum (Natural History), BMNH 1867.11.28.163 (1, poor condition), from Jakarta (Batavia), Java, according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Gymnura zonura*: Fowler, 1941: 451. No Philippine records. *Aetoplatea zonura*: Compagno & Last, 1999: 1508, ill. Western Central Pacific, no Philippine records.

**Philippine material:** Manila markets. 2 whole, Palapala, Cadiz City, BRU 105, female, 784 mm DW?, April 20, 1999; BRU 106, female, 1029 mm DW, April 20, 1999.

**Remarks:** New record for the Philippines. Herre (1953) did not mention this common Indo-Pacific butterfly ray in his checklist.

**Genus *Gymnura* Kuhl in van Hasselt, 1823. Butterfly rays.**

Genus *Gymnura* Kuhl in van Hasselt, 1823, Algemeene Konst-Letter-Bode, 1823, I, Deel, (20): 317. Type species: *Raja micrura* Bloch & Schneider, 1801, by monotypy. Not particularly characterized by van Hasselt: "A scarce animal here is that which is found in Russell Tabula 6 ["tenkee kunsul" = *Raja poecilura* Shaw, 1804] or Schneider's *R. micrura*, which was placed by Kuhl, according to his papers as a special genus under the name *Gymnura*" (translation from Alfred, 1961, Bull. Singapore Nat. Mus. [30]:82).

***Gymnura* cf. *micrura* (Bloch & Schneider, 1801). Smooth butterfly ray.**

*Raja micrura* Bloch & Schneider, 1801, Syst. Ichthyol.: 360. Type locality, Surinam, no types known according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *?Pteroplatea hirundo*: Casto de Elera, 1895: 621. Manila. *Gymnura micrura*: Fowler, 1941: 455. Casto de Elera's record, no specimens. *Gymnura* cf. *micrura*: Compagno & Last, 1999: 1509, fig. Western Central Pacific, Philippines.



**Philippine material:** ?As *G. australis*: 1 whole, Malabon Fish Port, Manila, JPAG 362, male, 495 mm TL, 694 mm DW, October 19, 2000.

**Remarks:** Nominal for area, and probably not the Atlantic species, *G. micrura*, or the Australian ray, *G. australis*. Initial identification is provisional and the specimen needs to be re-examined in the light of new information from other recent surveys of nearby regions.

***Gymnura poecilura* (Shaw, 1804). Longtail butterfly ray.**

*Raja poecilura* Shaw, 1804, Gen. Zool. 5(2): 291. Apparently based on Russell's (1803, Descr. Fish. Coromandel, London, 1: 4, pl. 6) "tenkee kunsul" from Visagapatam, India. Type locality: "Native of the Indian Seas." No material mentioned, no type-specimens according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Gymnura poecilura*: Fowler, 1941: 452. No Philippine records. Herre, 1953: 50. Capiz, Capiz Province, Panay. Compagno & Last, 1999: 1510, fig. Western Central Pacific, Philippines.

**Philippine material:** Navotas Market, Manila, 5 Oct. 1995, 581 mm DW, 296 mm DL, 429 mm TL, adult male (L. Compagno).

**Remarks:** Common in the Indonesian Archipelago and Gulf of Thailand, but possibly less so in the Philippines.

**Family Myliobatidae Bonaparte, 1838. Eagle rays.**

Subfamily Myliobatini Bonaparte, 1838, Nuov. Ann. Sci. Nat., Bologna, ser. 1, 2: 201 (Family Rajidae). Type genus: *Myliobatis* Cuvier, 1816.

**Genus *Aetobatus* Blainville, 1816. Spotted eagle rays.**

Subgenus *Aetobatus* Blainville, 1816 (Genus *Raja* Linnaeus, 1758), Bull. Sci. Soc. Philomat. Paris, (8): 112. Type species: *Aetobatus narinari*, designated by Gill (1894, Proc. U.S. Nat. Mus. 17: 112), = *Raja narinari* Euphrasen, 1790.

**Remarks:** Although there are reviews of the genus *Aetobatus* in Garman (1913), Gudger (1914), Fowler (1941), and Bigelow & Schroeder (1953), there are problems in applying existing taxonomic criteria to Indian Ocean and Pacific species. *Aetobatus* is in urgent need of revision on account of the vulnerability of these mostly large, spectacular rays to overfishing, and because of declines in numbers in some areas.

***Aetobatus* cf. *narinari* (Euphrasen, 1790). Spotted eagle ray.**

*Raja narinari* Euphrasen, 1790, Handl. K. Vetensk. Akad. 11: 217, pl. 10. No types known, according to Eschmeyer (1998, Catalog of Fishes, CD-ROM), type locality Brazil? (St. Bartholomew Is., West Indies?).

**References:** *Aetobatus narinari*: Roxas & Martin, 1937: 17. Philippines. Fowler, 1941: 471. U.S. National Museum of Natural History, USNM-170509, RV *Albatross* sta. 4656, Manila Harbor; USNM-170510, *Albatross* 8292, Sorsogon market; USNM-170511, RV *Albatross* 9054, Abuyog, Leyte (catalog numbers from USNM URL, 2002). Bigelow & Schroeder, 1953: 453, figs. 105-106. General, review of literature. Herre, 1953: 51. Taytay Bay, Palawan; Sulu Islands; Jolo Is., Sulu Province; Manila Bay, San Miguel Bay, Sorsogon Market, Sorsogon Province, Luzon; Abuyog, Leyte Province; Zamboanga, Zamboanga Province, Mindinao. Specimens in Philippine Bureau of Science and Ateneo de Manila Museum. Last & Stevens, 1994: 448, fig., pl. 79. Distribution, including Philippines. Compagno & Last, 1999: 1516, fig. Western Central Pacific, Philippines.

**Philippine material:** Large specimen at Malabon market, not saved or seen, type not certain, October 3, 1995. 1 whole, 2 tail-less, Pasil Fish Port I, Cebu City; Puerto Princesa Public Market; Salag Daku, Buenavista, Guimaras, JPAG 314, female, unknown TL, 570 mm DW, April 12, 2000; BRU 121, female, unknown TL, 268 mm DW, March 14, 2000; JPAG 028, female, unknown TL, 865 mm DW, February 14, 1999.

**Remarks:** Narrow and wide disc morphs, possibly separate species. JPAG 028, BRU 121, JPAG 314. Broad specimens typical of Pacific form of *A. narinari*. Snout distinctly bluntly pointed, angular. Remarkable consistency in the preoral snout length to DW ratio in these 3 specimens (283, 570, 857 mm DW) – prenarial snout (horizontal 7.4–7.5% DW). Similarly, nasal flap length 4.8–5.2% DW, internasal 4.4–4.6% DW. Pectoral base length slightly more variable 42.6–46% DW. Smallest specimen is a recently born juvenile with prominent

spots extending backward from about the mid-disc. Two larger females have diffuse-edged white spots extending over most of the disc and pelvic fins.

**?*Aetobatus* cf. *guttatus* (Shaw, 1804). Indian eagle ray.**

?*Raja guttata* Shaw, 1804, Gen. Zool., 5(2): 285, pl. 142. Based in part on the “Eel Tenkee” of Russell, 1803, Fish. Coromandel 1: 5, pl. 8, from Coromandel Coast, India, as well as the “Marinari” [sic.] of Marcgrave (1648). No type material. Shaw listed this species from Indian and African seas including Madagascar, Coromandel, and Brazil. This species is apparently a junior homonym of *Raja guttata* Bloch & Schneider, 1801, = *Dasyatis guttatus*.

**References:** *Aetobatus narinari*: Fowler, 1941: 473. *A. guttatus* in synonymy, no Philippine records. *Aetobatus guttatus*: Compagno & Last, 1999: 1515, fig. Western Central Pacific, no Philippine records.

**Philippine material:** ?1 tail-less, Pasil Fish Port I, Cebu City, JPAG 315, immature male, unknown TL, 465 mm DW, April 12, 2000.

**Remarks:** JPAG 315 is a plain brownish *Aetobatus* that appears to be distinct from typical Pacific *A. narinari*. While there is evidence of very faint white markings near the hind quarter of the upper disc, the white spotting typical of *A. narinari* is lacking. Its snout is distinctly shorter than *A. narinari* (horizontal prenasal snout 6.3% DW), and its nasal flap (4.1% DW) and internasal distance (4.1% DW) shorter. However, the pectoral-fin base length (including the rear tip) is similar to the typical form of *A. narinari* (44.1% DW). The outer margin of the internasal flap bears a small, broad leaf-shaped flap. This flap is distinctly larger and more circular than in other forms.

**Genus *Aetomylaeus* Garman, 1908.**

Genus *Aetomylaeus* Garman, 1908, Bull. Mus. Comp. Zool. Harvard, 51(9): 252. Type species: *Myliobatis maculatus* Gray, 1832, by original designation.

**?*Aetomylaeus milvus* (Valenciennes, 1841). Ocellate eagle ray.**

*Myliobatis milvus* Valenciennes, in Müller & Henle, 1841, Syst. Besch. Plagiost., pt. 3: 178. Syntypes: Four stuffed specimens in the Museum National d’Histoire Naturelle, Paris, MNHN–2338, MNHN–2339 (2), MNHN–3480, from the Red Sea, after Eschmeyer (Catalog of Fishes, CD-ROM).

**References:** *Myliobatis milvus*: Casto de Elera, 1895: 621. Manila, Luzon. *Aetomylus milvus*: Fowler, 1941: 466. Casto de Elera’s record, no specimens. *Aetomylaeus milvus*: Compagno & Last, 1999: 1517, fig. Western Central Pacific, Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) did not list this species in his checklist. Possibly the juvenile of *Aetomylaeus maculatus* (Gray, 1834).

**?*Aetomylaeus nichofii* (Bloch & Schneider, 1801). Banded eagle ray.**

*Raja Nichofii* Bloch & Schneider, 1801, Syst. Ichthyol.: 364; *Ibid.*, 579; erroneous spelling *Raja Nichofii* sometimes replaced by *Raja Niehofii* Bloch & Schneider, 1801, but the original usage is followed as with general use. No types according to Eschmeyer (1998, Catalog of Fishes, CD-ROM), who notes that Bloch & Schneider’s corrected spelling *Raja Niehofii* is valid. Type locality East Indies. Müller & Henle (1841, Syst. Besch. Plagiost., pt. 3: 177) did not list any Bloch & Schneider types under their *Myliobatis Nieuhofii*. Paepke & Schmidt (1988, Mitt. Zool. Mus. Berlin 64 [1]: 133–189) did not mention any types for this species in their review of types (including Bloch & Schneider types) of cartilaginous fishes in the Humboldt Museum collection.

**References:** *Myliobatis nieuhoffi*: Casto de Elera, 1895: 621. Cavite, Luzon. *Aetomylus nichofii*: Fowler, 1941: 467. No material, on Casto de Elera’s record. *Aetomylaeus nichofii*: Last & Stevens, 1994: 450, fig., pl. 79. Distribution, including Philippines. Compagno & Last, 1999: 1517, fig. Western Central Pacific, Philippines.

**Philippine material:** None.

**Remarks:** Herre (1953) did not list this species in his checklist. Not observed in WWF project but moderately common in adjacent regions.

***Aetomylaeus vespertilio* (Bleeker, 1852). Ornate eagle ray.**

*Myliobatis vespertilio* Bleeker, 1852, Verh. Batav. Genoots. Kunst. Wet. 24 (12): 85. Holotype: Possibly Rijksmuseum van Natuurlijke Historie, Leiden, RMNH 7460, from Batavia, Java, according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Aetomylus vespertilio*: Fowler, 1941: 467. No Philippine records. *Aetomylaeus vespertilio*: Last & Stevens, 1994: 451, fig., pl. 79. Distribution, no Philippine records. Compagno & Last, 1999: 1518, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 1 whole, Pasil Fish Port I, Cebu City, JPAG 324, immature male, 1,573 mm TL, 532 mm DW, April 12, 2000.

**Remarks:** Herre (1953) did not list this species in his checklist. JPAG 324, a neonatal juvenile male, has well-developed transverse lines across the disc anteriorly and diffuse-edged white spots along its hind margin and on the pelvic fins. The tail is strongly compressed anteriorly, becoming more rounded at about half its length. The dorsal-fin origin is slightly forward of the pelvic-fin tips, pectoral-fin apices distinctly falcate, and the spiracles are enormously enlarged, with the postorbital processes expanded posterolaterally and tilted posterodorsally. No local records of adults are available. Apparently, a new record for the Philippines.

**Genus *Myliobatis* Cuvier, 1816. Eagle rays.**

Subgenus *Myliobatis* Cuvier, 1816 (Genus *Raia* “Linnaeus”), Reg. Anim., ed. 1, 2: 137. Cuvier (*loc. cit.*) gave a detailed account of only one species in the subgenus, *Raia aquila* (*Raja aquila*) Linnaeus, 1758, but other species were mentioned in footnotes. Type species: *Raja aquila* Linnaeus, 1758, by subsequent designation of Bory de Saint-Vincent (1828, Dictionnaire Classique d’Histoire Naturelle. Dict. Classique, 14: 449) according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

***Myliobatis cf. tobije* Bleeker, 1854. Philippine kite ray.**

*Myliobatis tobije* Bleeker, 1854, Nat. Tijdschr. Neder. Indie, 1854, 6: 425. Also Bleeker, 1857, Verh. Batav. Genoots. (Japan), 26: 130, the commonly and incorrectly cited first appearance of the name. Holotype: Rijksmuseum van Natuurlijke Historie, Leiden, RMNH 7461 female, 230 lines wide, from Nagasaki, Japan, in part from Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Holorhinus tobije*: Fowler, 1941: 463. No Philippine records. *Myliobatis tobije*: Compagno & Last, 1999: 1519, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 1 tail-less, Pasil Fish Port II, Cebu City, JPAG 329, female, unknown TL, 663 mm DW, April 13, 2000; 1 tailless, 2 whole, Palapala Fish Port, Cadiz City, BRU 165, female, unknown TL, 255 mm DW, April 6, 2000; BRU 181, female, 843 mm TL, 363 mm DW, April 10, 2000; BRU 166, immature male, 1,080 mm TL, 295 mm DW, April 6, 2000; 1 whole, 1 tail-less, Pasil Fish Market, Cebu City, BRU 180, female, 1,190 mm TL, 543 mm DW, April 10, 2000; JPAG 130, adolescent male, unknown TL, 571 mm DW, April 22, 1999; 1 tail-less, Pasil Fish Market, Cebu City, JPAG 147, adolescent male, unknown TL, 557 mm DW, April 22, 1999.

**Remarks:** Herre (1953) did not list this species in his checklist. Probably conspecific with Japanese forms. Separate long- and shortnose forms are probably linked to sexual dimorphism. Females have a very short snout on a broad, robust head. Two late adolescent males (JPAG 130 and JPAG 147) have a relatively elongate snout and relatively narrow internasal flap. A developing male (BRU 166) displays intermediate head morphometrics between females and the maturing males. Some intraspecific variation also exists regarding angularity of the pectoral fins. A smaller female (BRU 180) has distinctly falcate pectoral fins that seem to be less evident in the males. Posterior placement of the dorsal fin is typical for both females and males being located 0.5–1 times the eye diameter behind the pelvic rear tip. An adolescent male (JPAG 147) has 5 rows of teeth in the upper jaw with the central row very broad, and the lateral rows about as wide as long; 5 rows in the lower jaw, laterals similarly reduced; measurements expressed as a percentage of DW – internasal 6.65; horizontal prenasal 7.94; direct snout length 11.95; eye length 2.97; nostril length 2.15; mouth width 7.92; interorbital space (posterior of eye) 16.0. In smaller immature male – internasal 6.81; horizontal prenasal 6.96; direct snout length 10.48; eye length 3.29; nostril length 2.40; mouth width 8.70; interorbital space (posterior of eye) 16.65. In females – internasal 6.44–7.24; horizontal prenasal 6.10–6.34; direct snout length 9.82–11.34; eye length 3.38–3.51; nostril length 1.96–2.06; mouth width 8.66–9.6; interorbital space (posterior of eye) 15.82–16.9.

## Family Rhinopteridae Jordan & Evermann, 1896. Cownose rays.

Subfamily Rhinopterinae Jordan & Evermann, 1896 (Family Myliobatidae), Bull. U.S. Nat. Mus. (47), pt. 1: 88. Type genus: *Rhinoptera* Kuhl in Cuvier, 1829.

### Genus *Rhinoptera* Kuhl in Cuvier, 1829. Cownose rays.

Subgenus *Rhinoptera* Kuhl in Cuvier, 1829 (Genus *Raia* “Linnaeus”), Reg. Anim., ed. 2, 2: 401 Cuvier attributed this genus to Kuhl without further reference, but gave a short diagnosis. Two species, *Myliobatis marginata* E. Geoffroy St.-Hilaire, 1817, and *Raja quadriloba* Lesueur, 1817, were mentioned by Cuvier (*loc. cit.*, fn. 4) without mention of a type. Type species: *M. marginata* St.-Hilaire, 1817, by subsequent restriction of Bonaparte (1838, Nuov. Ann. Sci. Nat. Bologna 2: 201) and by subsequent designation of Hay (1902, Bull. U.S. Geol. Surv. (179): 321), and Fowler (1911, Geol. Soc. New Jersey Bull. [4]: 101); in part after Eschmeyer (1998, Catalog of Fishes, CD-ROM).

### *Rhinoptera javanica* Müller & Henle, 1841. Javanese cownose ray.

*Rhinoptera javanica* Müller & Henle, 1841, Syst. Besch. Plagiost. (pt. 3): 182, pl. 58. Syntypes: Three in Rijksmuseum van Natuurlijke Historie, Leiden, RMNH (dry specimens), Java; possibly two in Museum National d’Histoire Naturelle, Paris, ?MNHN–2450, MNHN 3478, Malabar, India; Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** *Rhinoptera javanica*: Roxas & Martin, 1937: 17. Philippines. Fowler, 1941: 476. Philippines, U.S. National Museum of Natural History, USNM–170363 RV *Albatross* sta. 6763, USNM–170364, RV *Albatross* sta. 6764, both from Manila market (catalog numbers from USNM URL, 2002). Herre, 1953: 52. SW Samar; Manila Bay, Ragay Gulf, Manila Market, Luzon. Compagno & Last, 1999: 1522, fig. Western Central Pacific, Philippines.

**Philippine material:** Bolinao Market, near Bolinao in less than 40 m, morning market, October 7, 1995, female, 1001 mm TL, 512 mm DW, 293 DL (L. Compagno); 1 whole, 1 tailless, Puerto Princesa Public Market, JPAG 208, female, 504 mm DW, March 12, 2000; JPAG 209, female, 796 mm TL, 539 mm DW, March 12, 2000.

**Remarks:** Probably more common than landings suggest.

## Family Mobulidae Gill, 1893. Devil rays.

Family Mobulidae Gill, 1893, Natn. Acad. Sci. USA, Mem. 6, 6: 130. Type genus: *Mobula* Rafinesque, 1810.

### Genus *Manta* Bancroft, 1828. Mantas.

Genus *Manta* Bancroft, 1829, Zool. J. 4: 454. Type species: *Cephalopterus manta* Bancroft, 1828, by monotypy and absolute tautonymy according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

### *Manta birostris* (Walbaum, 1792). Manta.

*Raja birostris* Walbaum, 1792, P. Artedi Genera Pisc. Emend. Ichthyol. 3: 535. Nonbinomial according to Whitley (1936, Aust. Zool., 8: 180) and some subsequent authors, including Bigelow & Schroeder (1953), base the species on Donndorff’s 1798 use of Walbaum’s species; others, including Fowler (1941), assigned it to Walbaum. Eschmeyer (1998, Catalog of Fishes, CD-ROM) notes that in Walbaum’s account of *R. birostris* “...the style of this section suggests that the second word “*birostris*” was not italicized through an oversight (see index) and binominal nomenclature was intended.” No type specimens according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

*Raja birostris* Donndorff, 1798, Zool. Beitr. 3: 876. (reference to Walbaum, 1792).

**References:** *Manta birostris*: Fowler, 1941: 483. No Philippine records. Bigelow & Schroeder, 1953: 502, figs 111–112, 116–117. General data, review of literature. Last & Stevens, 1994: 448, fig., pl. 79. Distribution, including Philippines. Compagno & Last, 1999: 1527, fig. Western Central Pacific, including Philippines.

**Philippine material:** Photos of live animal, Dumaran Island, JPAG 206, unknown sex, unknown TL, unknown DW, July 1, 1999.

**Remarks:** Widespread. Last & Stevens' and Compagno & Last's records were confirmed by photographic evidence. Herre (1953) did not record this species in his checklist.

**Genus *Mobula* Rafinesque, 1810. Devil rays.**

Genus *Mobula* Rafinesque, 1810, Indice Ittiol. Sicil.: 48, 61. Type species: *Mobula auriculata* Rafinesque, 1810, by monotypy, = *Raia mobular* Bonnaterre, 1788.

**Identity uncertain:** *Mobula diabolus*: Fowler, 1941, in part: 480. *Mobula eregoodootenkee*, *M. kuhlii*, *M. thurstoni* in synonymy, Philippine specimen in Academy of Natural Sciences, Philadelphia, ANSP, Philippines.

**Remarks:** The taxonomy of devil rays (*Mobula*) is difficult and species were often misidentified in the past. Hence old published records of devilrays are hard to place if they not adequately described, not illustrated, or not backed by voucher specimens. See Notarbartolo di Sciara (1987) for a review of the genus and key to species; and Compagno & Last (1999) for a key to the Western Central Pacific species.

***Mobula eregoodootenkee* (Bleeker, 1859). Longfin devilray.**

*Cephaloptera eregoodoo-tenkee* Bleeker, 1859, Act. soc. sci. Ind. Neerl., 6: 314. Apparently the first valid use of Russell's name in full in a species name (cited in Garman, 1913, Mem. Harvard Mus. Comp. Zool., 36: 451, who recognizes this species as *Mobula eregoodoo-tenkee*). Possibly no types.

"Eregoodoo-tenkee" Cuvier, 1829, Reg. Animal, 2: 402, fn. 1. Based on Russell's (1803, Descr. Fish. Coromandel, London, 1: 5, pl. 9) "eregoodoo tenkee" from India. Neotype: California Academy of Sciences, CAS-56095, 969 mm DW adult male, Gulf of Thailand off Cambodia, c. 1 nm E. of Goh Choaw and 10–12 nm SSE of Goh Kong, 11°03'–05'N, 103°03'30"–05'E, designated by Notarbartolo di Sciara (1987, Zool. J. Linnean Soc. London, 91: 30). There is a problem with attribution of "eregoodoo-tenkee" as cited in Cuvier (*loc. cit.*) to a described species. The italicized name is mentioned in a footnote to the subgenus *Cephaloptera* and is not a diagnosed species such as *Raja jussieu* Cuvier (*loc. cit.*: 401). Rather, the context and brevity of the citation suggests that Cuvier was merely citing Russell's vernacular name as belonging to a member of *Cephaloptera* rather than formally naming a species ("Eregoodoo-tenkee, Russ., I, 9."). Eschmeyer (1998, Catalog of Fishes, CD-ROM), independently came to the same conclusion on Cuvier's citation of Eregoodoo-tenkee as a vernacular, not a species name.

**References:** *Mobula diabolus*: Fowler, 1941: 480, in part. Philippines, Albatross 5705, Manila market. *Mobula eregoodoo*: Roxas & Martin, 1937: 17. Philippines. *Mobula eregoodoo-tenkee*: Herre, 1953: 53. Cited under this name, but including citations of *M. kuhlii* and *M. thurstoni*. Nominal records on specimens from Manila Bay, Mariveles Bay Pataan Prov; Calabanga, Camarines Sur Province (San Miguel Bay); Luzon. Maqueda Bay, Samar; Cebu market, Cebu; Dumaguete; Siquijor; Zamboanga, Zamboanga Province Mindanao; Tawitawi, Sibutu, and Sitankai, Sulu Province. *Mobula eregoodootenkee*: Notarbartolo di Sciara, 1987: 30, figs. 11–12. Examined U.S. National Museum of Natural History, USNM-170365, RV *Albatross* 5705, Manila market (catalog number confirmed from USNM URL). Last & Stevens, 1994: 460, fig., pl. 81. Distribution, including Philippines. Compagno & Last, 1999: 1527, fig. Western Central Pacific, including Philippines.

**Philippine material:** None examined by the WWF elasmobranch biodiversity project.

**Remarks:** Widespread in the Indo-Pacific, Philippine record from Notarbartolo di Sciara (1987).

***Mobula kuhlii* (Valenciennes, in Müller & Henle, 1841). Shortfin devilray.**

*Cephaloptera kuhlii* Valenciennes, in Müller & Henle, 1841, Syst. Besch. Plagiost. (3): 185, pl. 59, fig. 1. Syntypes: Museum National d'Histoire Naturelle, MNHN 1596 (type cat. 116) 715 mm DW juvenile male, Indian Ocean, no further locality; a head of another specimen, possibly lost, in the Museum National d'Histoire Naturelle, British Museum (Natural History), BMNH-uncat., 610 mm DW stuffed individual, sex uncertain, no locality. Seret & McEachran (1986, Bull. Mus. Nat. Hist. Nat., Paris, 4th ser., 8, sect. A (4): 26) listed MNHN-1596 as a lectotype, and indicated that G. Notarbartolo di Sciara would designate it as such. However, Notarbartolo di Sciara (1987, Zool. J. Linnean Soc. London, 91: 51) deliberately refrained from designating the two syntypes he'd examined as lectotype and paralectotype, because of their poor condition.

**References:** Notarbartolo di Sciara, 1987: 47, fig. 10C. No Philippine specimens or records. Compagno & Last, 1999: 1528, fig. Western Central Pacific, no Philippine records.

**Philippine material:** 1 whole specimen with posterior part damaged, Iloilo City Fish Port, BRU 031, male, 1,325 mm DW, February 13, 1999.

**Remarks:** New record for the Philippines.

***Mobula thurstoni* (Lloyd, 1908). Bentfin devilray.**

*Dicerobatis thurstoni* Lloyd, 1908, Rec. Indian Mus. 2(2): 179, Pl. 4, fig. 2. Holotype: Government Museum of Madras, no number, dried adult male, about 1600 mm DW, no locality data, whereabouts unknown according to Eschmeyer (1998, Catalog of Fishes, CD-ROM).

**References:** Notarbartolo di Sciara, 1987: 36, figs. 2A, 8B, 13–17. No Philippine specimens or records. Last & Stevens, 1994: 463, fig., pl. 81. Distribution, no Philippine records. Compagno & Last, 1999: 1529, fig. Western Central Pacific, no Philippine records.

**Philippine material:** *Mobula* sp. ca 1–1.5 m DW at Malabon mkt (J. Randall, pers. comm.), with white-tipped dorsal fin, not saved or seen by L. Compagno or P. Last, October 3, 1995, possibly this species, photos. Pasil Fish Port I, Cebu City, JPAG 302, male, unknown TL, April 10, 2000.

**Remarks:** Possible new record for the Philippines.

## ACKNOWLEDGEMENTS

This review of the Philippine chondrichthyan fauna is based on literature records, expanded to include new data collected on the Taiwanese deepwater trawl survey, by FAO projects, and WWF-funded surveys of southern Philippine fish markets. The authors wish to acknowledge the support of lead agencies WWF-Philippines and WWF-USA without whose support the new material from the vicinity of the remarkable Sulu Sea would not have been obtained. Ms Andy Oliver (formerly WWF-USA) was instrumental in getting this project off the ground and we dedicate this paper to her efforts. She also provided considerable input and advice in various components of the Sulu Sea study. Other agencies providing significant support and resources include Silliman University (Dumaguete, Philippines), the Commonwealth Scientific Industrial Research Organization Marine Research (Hobart, Australia), ICLARM (formerly Manila, Philippines), FAO (Rome, Italy), and the Taiwan Fisheries Research Institute (Taipei, Taiwan). Ms M-M Luchavez-Maypa and Mr J.P. Guadiano were instrumental in acquiring valuable material from local fish markets and their efforts and dedication to the WWF project were exceptional. Similarly, the efforts of Dr K. Carpenter in organizing a workshop in Manila in 1995 to produce the Western Central Pacific identification guides led to several new Philippine records and was the impetus behind the Taiwanese trawl survey. Considerable assistance was provided by ICLARM staff at this workshop. The authors also wish to thank Mr B.R. Samaniego, Dr H.P. Calumpong, Mr V. Manlulu who contributed in various ways to workshops, training sessions, and compiling the expanded list of species from the Sulu Sea. We thank Dr W. White and Mr G.K. Yearsley for providing detailed comments on the manuscript. Mr G.K. Yearsley kindly laid out the document and it was converted to a pdf file by Ms H. Webb. Mr T. Fountain helped with proof reading. Ms L. Bell provided assistance with publication formalities.

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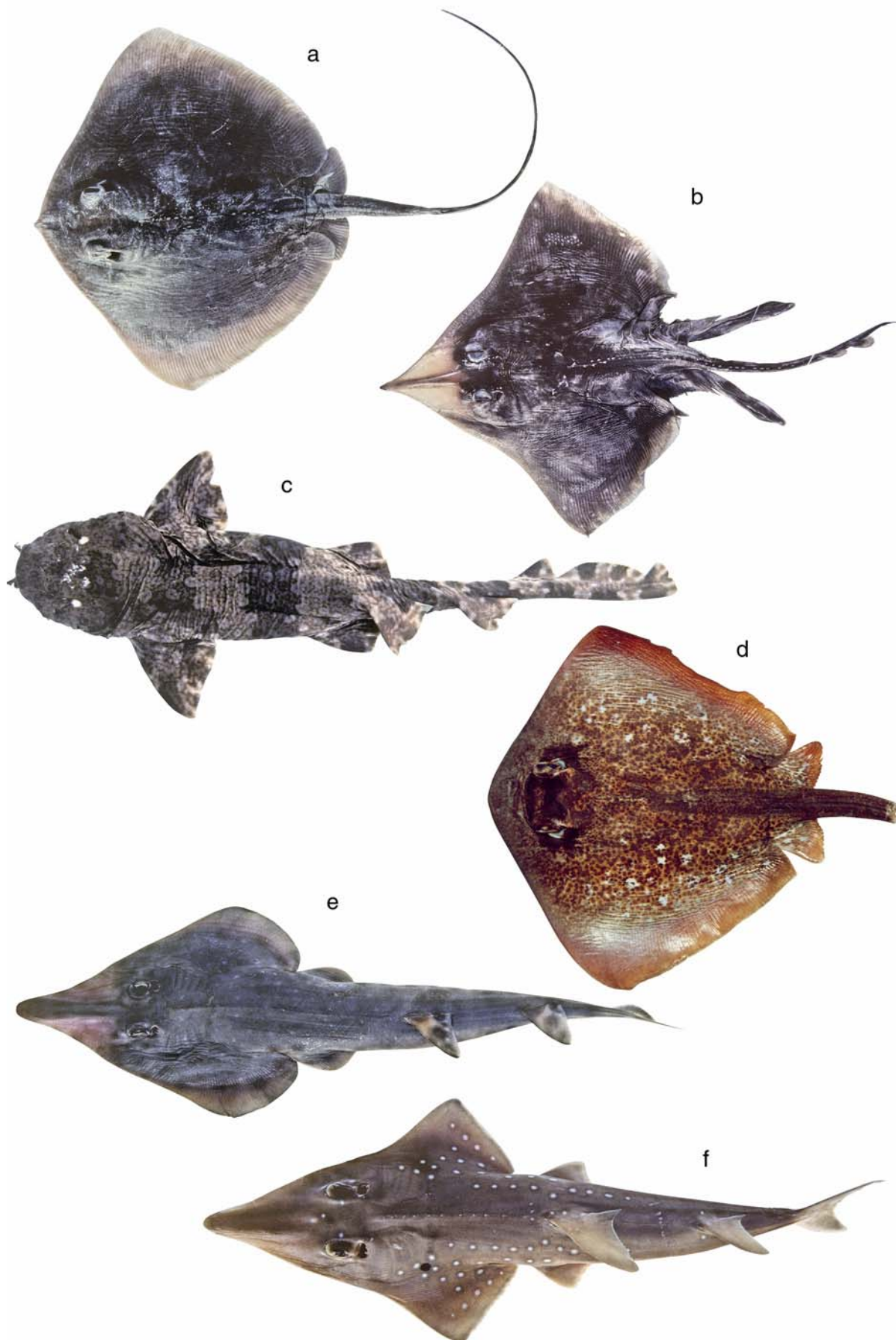
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**Figure 1:** Selected fishes collected during the WWF project: a. *Dasyatis cf. akajei*, JPAG 52; b. *Dipturus* sp. 4, BRU 96; c. *Orectolobus cf. ornatus*, JPAG 129; d. *Dasyatis* sp. 1, JPAG 37; e. *Rhinobatos cf. schlegelii*, JPAG 79; f. *Rhynchobatus australiae*, JPAG 157.





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ISBN 1 876996 95 1

ISSN 0725-4598