Bibliography database of living/fossil sharks, rays and chimaeras (Chondrichthyes: Elasmobranchii, Holocephali)

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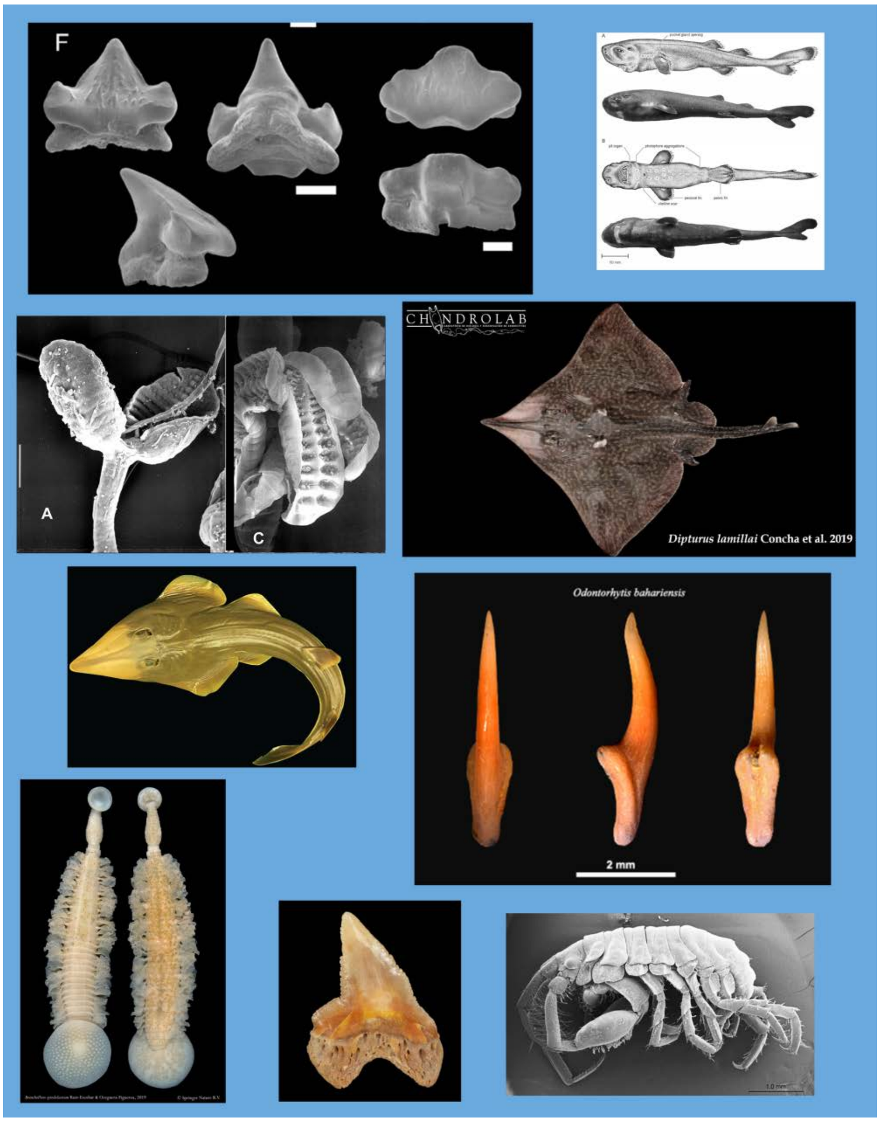

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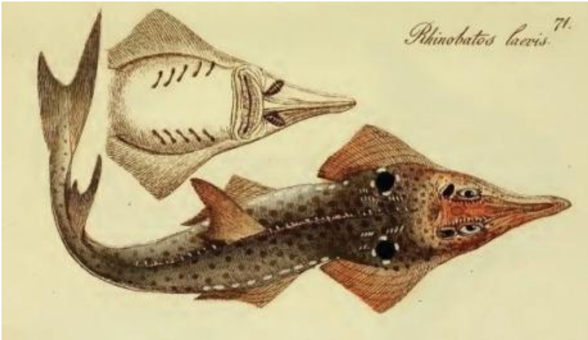

Abstract: This paper contains a collection of 808 citations (no conference abstracts) on topics related to extant and extinct Chondrichthyes (sharks, rays, and chimaeras) as well as a list of Chondrichthyan species and hosted parasites newly described in 2019. The list is the result of regular queries in numerous journals, books and online publications. It provides a complete list of publication citations as well as a database report containing rearranged subsets of the list sorted by the keyword statistics, extant and extinct genera and species descriptions from the years 2000 to 2019, list of descriptions of extinct and extant species from 2019, parasitology, reproduction, distribution, diet, conservation, and taxonomy. The paper is intended to be consulted for information. In addition, we provide data information on the geographic and depth distribution of newly described species, i.e. the type specimens from the years 1990 to 2019 in a hot spot analysis. The subheader "biodiversity" comprising a complete list of all valid chimaeriform, selachian and batoid species, as well as a list of the top 20 most researched chondrichthyan species.

Please note that the content of this paper has been compiled to the best of our abilities based on current knowledge and practice, however, possible errors cannot entirely be excluded.

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3. Database Reports

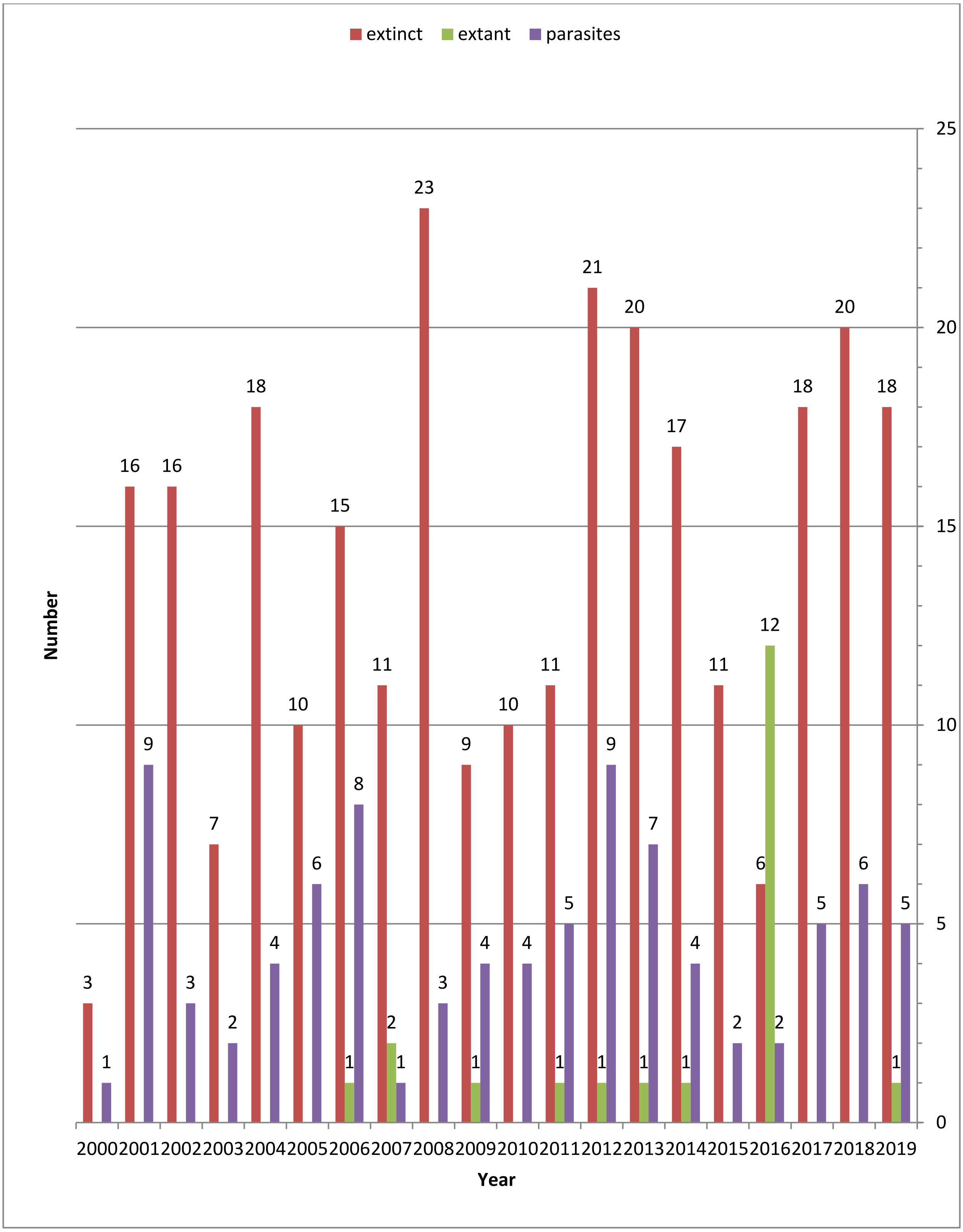
3.1 Statistics

3.1.1 Newly described genera 2000 – 2019

Table 1: Describes extinct, extant and parasite genera in the years 2000 to 2019.

year	extinct	extant	parasites
2000	3		1
2001	16		9
2002	16		3
2003	7		2
2004	18		4
2005	10		6
2006	15	1	8
2007	11	2	1
2008	23		3
2009	9	1	4
2010	10		4
2011	11	1	5
2012	21	1	9
2013	20	1	7
2014	17	1	4
2015	11		2
2016	6	12	2
2017	18		5
2018	20		6
2019	18	1	5

Figure 1: Barchart showing comparisons of genus descriptions in the three categories extinct, extant, and parasites. Extinct genus descriptions clearly dominate the descriptions record.

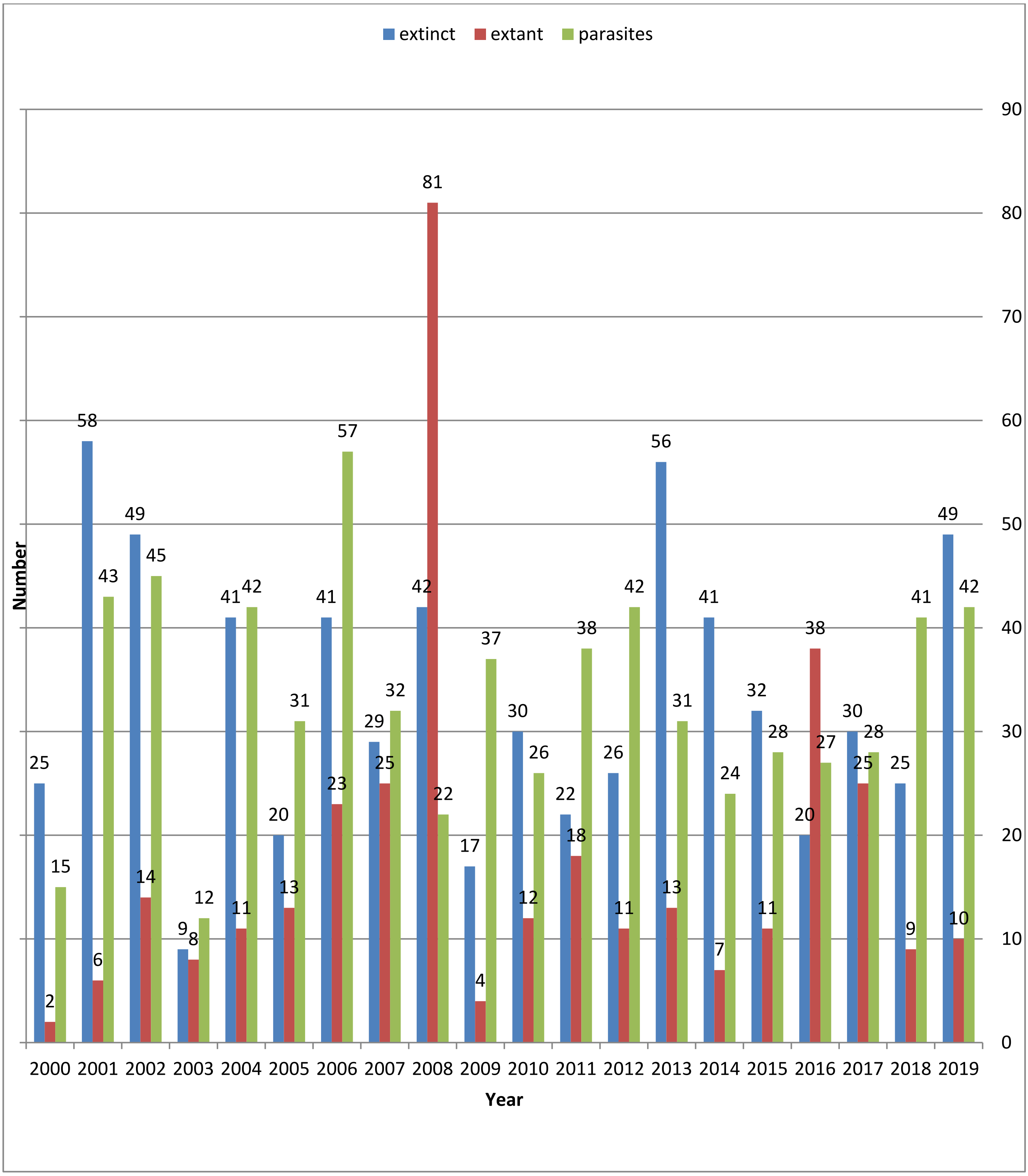


3.1.2 Newly described species 2000 – 2019

Table 2: Describes extinct, extant and parasite species in the years 2000 to 2019.

year	extinct	extant	parasites
2000	25	2	15
2001	58	6	43
2002	49	14	45
2003	9	8	12
2004	41	11	42
2005	20	13	31
2006	41	23	57
2007	29	25	32
2008	42	81	22
2009	17	4	37
2010	30	12	26
2011	22	18	38
2012	26	11	42
2013	56	13	31
2014	41	7	24
2015	32	11	28
2016	20	38	27
2017	30	25	28
2018	25	9	41
2019	49	10	42

Figure 2: Barchart showing comparisons of species descriptions in the three categories extinct, extant, and parasites. Extinct and parasite species descriptions dominate the descriptions record with the exception of the year 2008 and 2016.



3.1.3 Hot spots (types)

3.1.3.1 Hot spots (types): Summary

Table 3: Summary of collection and specimen numbers of type specimens of Chondrichthyes recorded and described in the years 1990 to 2019.

Year	Number		Without coordinates		Without FAO area	
	# Zoological collection entries	# specimen	# Zoological collection entries	# specimen	# Zoological collection entries	# specimen
1990-1999	409	515	56	59	2	2
2000-2009	1736	1981	119	130	21	29
2010-2019	1091	1394	272	341	6	6
Total:	**3236**	**3890**	**447**	**530**	**29**	**37**

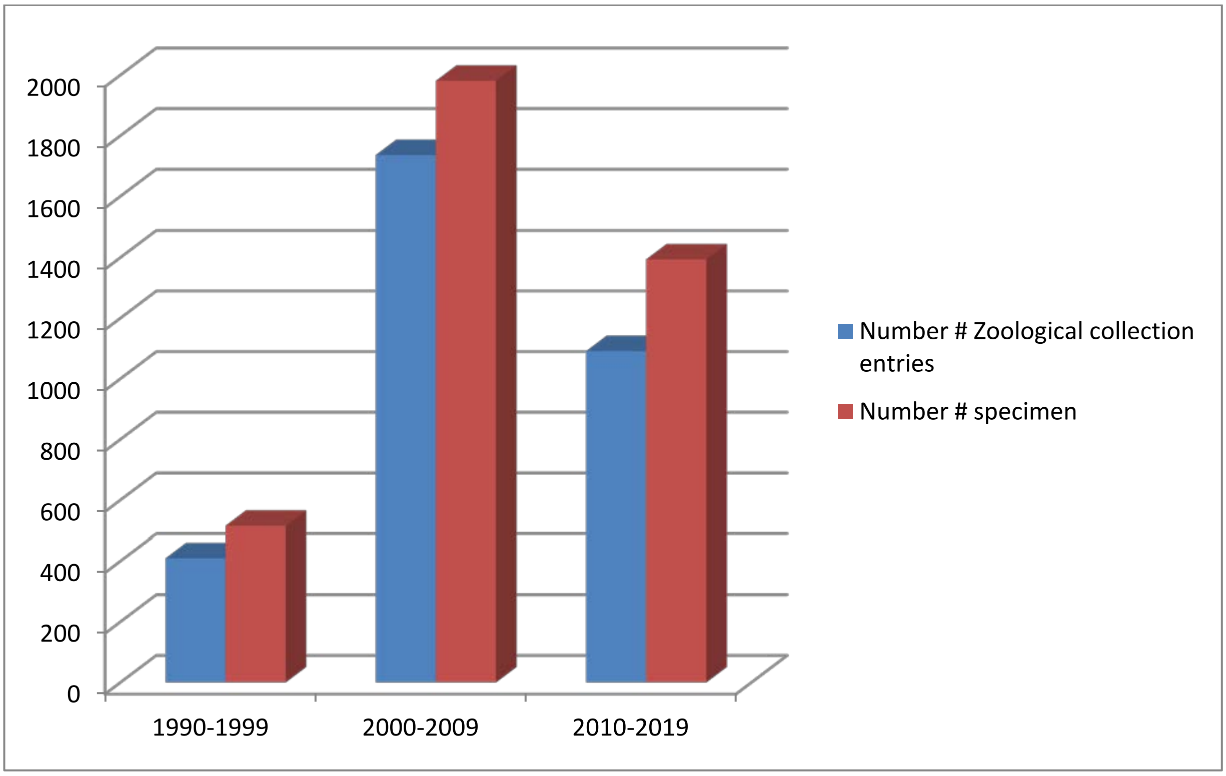


Figure 3: Barchart comparisons of zoological collection and specimen numbers from the years 1990 to 2017 from newly described extant species. Number of species descriptions peak in the years 2000-2009.

3.1.3.2 Hot spots (types): FAO areas - Map -

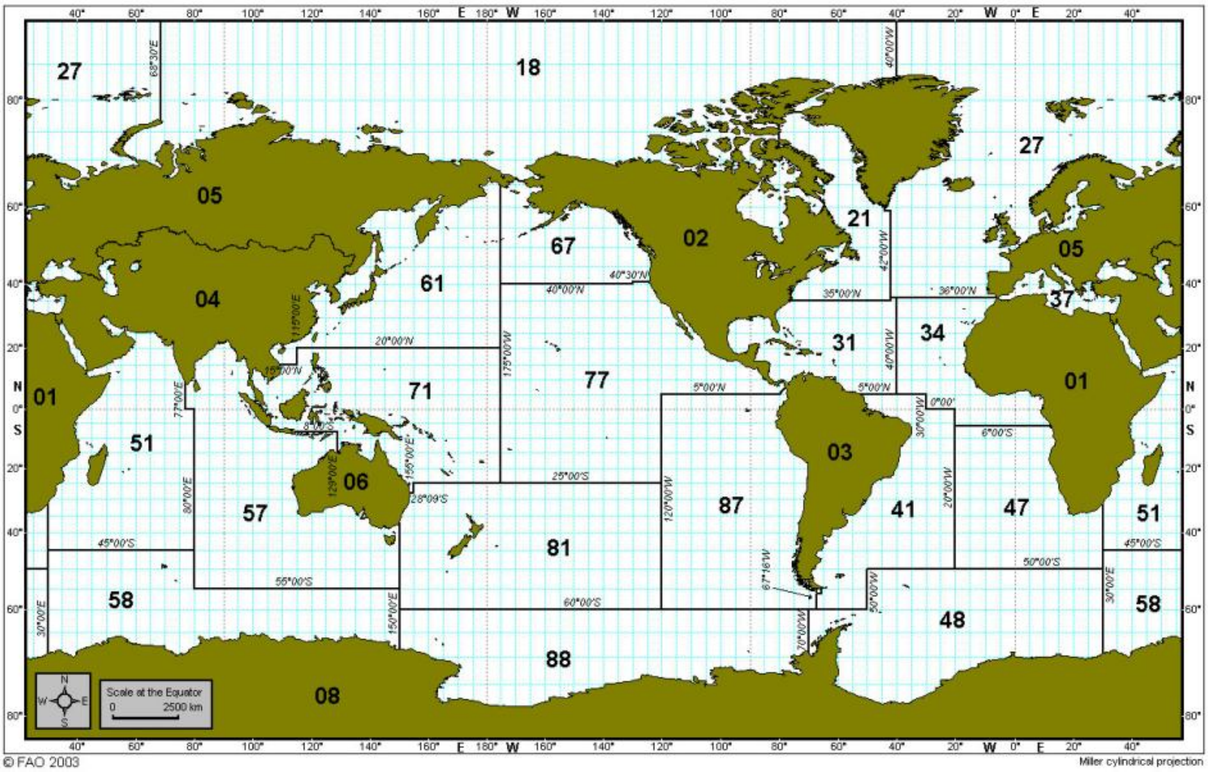


Figure 4: FAO fishing areas of the world's oceans:

Browse FAO Fishing Areas Fact Sheets by list:

Area 18 (Arctic Sea)
Area 21 (Atlantic, Northwest)
Area 27 (Atlantic, Northeast)
Area 31 (Atlantic, Western Central)
Area 34 (Atlantic, Eastern Central)
Area 37 (Mediterranean and Black Sea)
Area 41 (Atlantic, Southwest)
Area 47 (Atlantic, Southeast)
Area 48 (Atlantic, Antarctic)
Area 51 (Indian Ocean, Western)
Area 57 (Indian Ocean, Eastern)
Area 58 (Indian Ocean, Antarctic and Southern)
Area 61 (Pacific, Northwest)
Area 67 (Pacific, Northeast)
Area 71 (Pacific, Western Central)
Area 77 (Pacific, Eastern Central)
Area 81 (Pacific, Southwest)
Area 87 (Pacific, Southeast)
Area 88 (Pacific, Antarctic)

3.1.3.3 Hot spots (types): FAO areas - number of types/specimens/species/FAO area

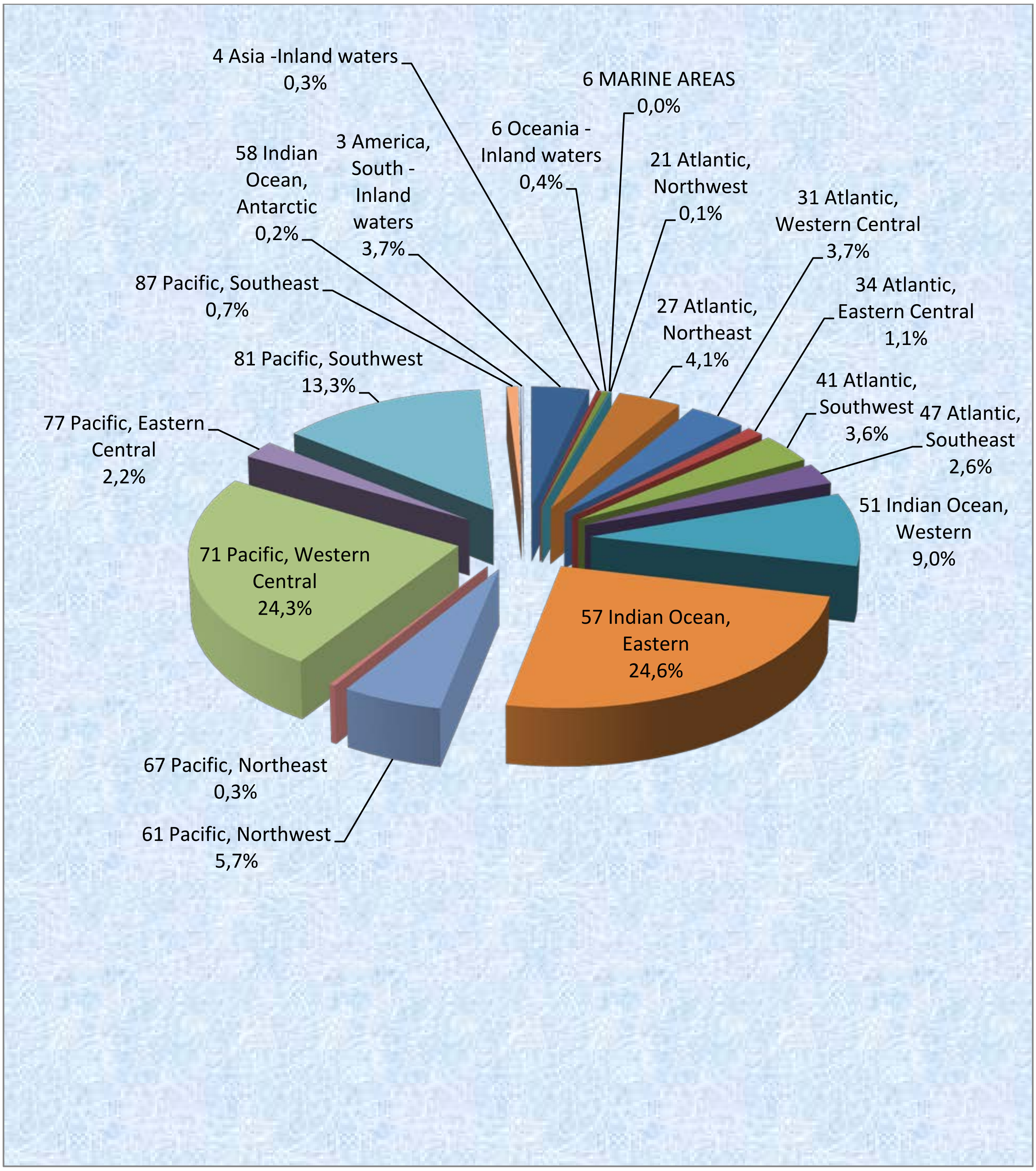
Table 4: List of zoological collection entries, specimen and species numbers from the years 1990 to 2019 and associated FAO areas.

	nr. of FAO area	FAO area	nr. of collection numbers	nr. of specimen	nr. of species
		INLAND WATERS			
	1	Africa - Inland waters	0	0	0
	2	America, North - Inland waters	0	0	0
	3	America, South - Inland waters	119	121	17
	4	Asia -Inland waters	9	9	3
	5	Europe - Inland waters	0	0	0
	6	Oceania - Inland waters	13	13	1
	7	(Former USSR area – Inland waters)	0	0	0
	8	Antarctica - Inland waters	0	0	0
		MARINE AREAS			
Atlantic Ocean and adjacent seas	18	Arctic Sea	0	0	0
	21	Atlantic, Northwest	4	9	2
	27	Atlantic, Northeast	131	148	23
	31	Atlantic, Western Central	120	175	13
	34	Atlantic, Eastern Central	36	37	7
	37	Mediterranean and Black Sea	0	0	0
	41	Atlantic, Southwest	115	116	18
	47	Atlantic, Southeast	83	92	14
Indian Ocean	51	Indian Ocean, Western	290	445	49
	57	Indian Ocean, Eastern	791	892	106
Pacific Ocean	61	Pacific, Northwest	182	196	34
	67	Pacific, Northeast	11	24	3

	71	Pacific, Western Central	783	812	120
	77	Pacific, Eastern Central	70	130	11
	81	Pacific, Southwest	429	540	59
	87	Pacific, Southeast	24	51	9
Southern Ocean	48	Atlantic, Antarctic	0	0	0
	58	Indian Ocean, Antarctic	7	7	1
	88	Pacific, Antarctic	0	0	0

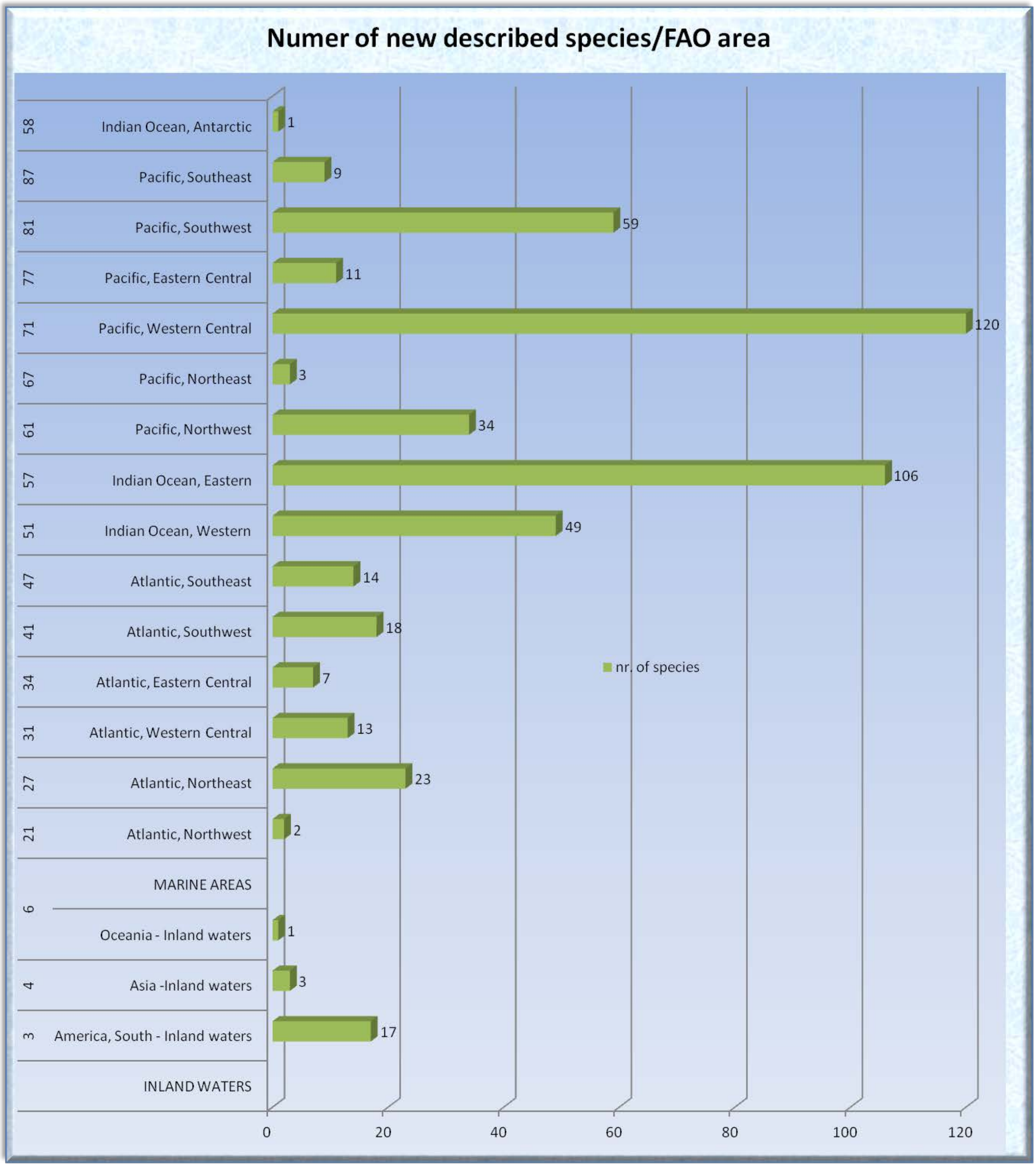
3.1.3.4 Hot spots (types): FAO areas - number of types/FAO area

Figure 5: Piechart showing percentage of all deposited type material from extant species descriptions in associated FAO fishing areas (please see Figure 4 for geographical details).



3.1.3.5 Hot spots (types): FAO areas - number of newly described species/FAO area

Figure 6: Numbers of newly described species and associated FAO fishing areas (please see Figure 4 for geographical explanations). FAO areas 71 (Western Central Pacific) and 57 (Eastern Indian Ocean) appear as highly diverse areas.

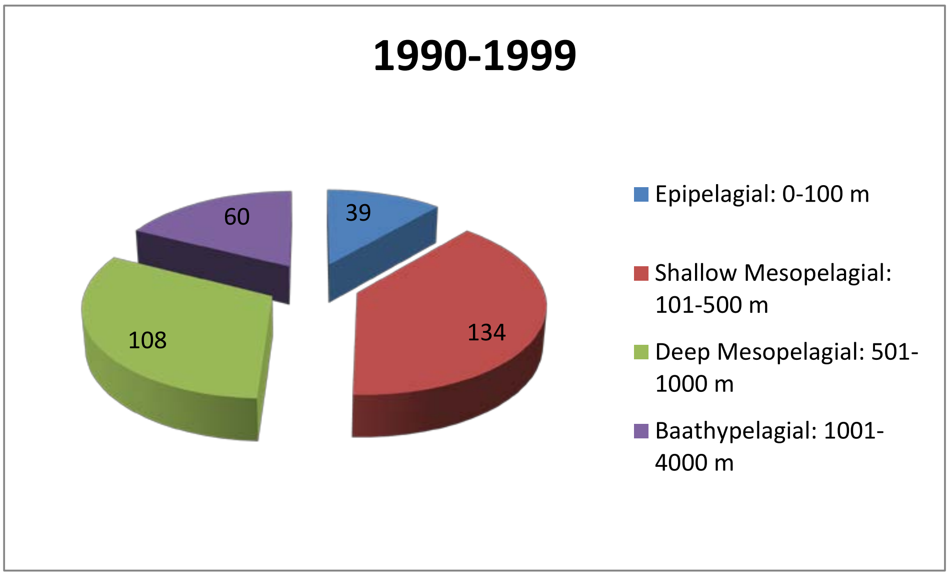


3.1.3.5 Hot spots (types): depth

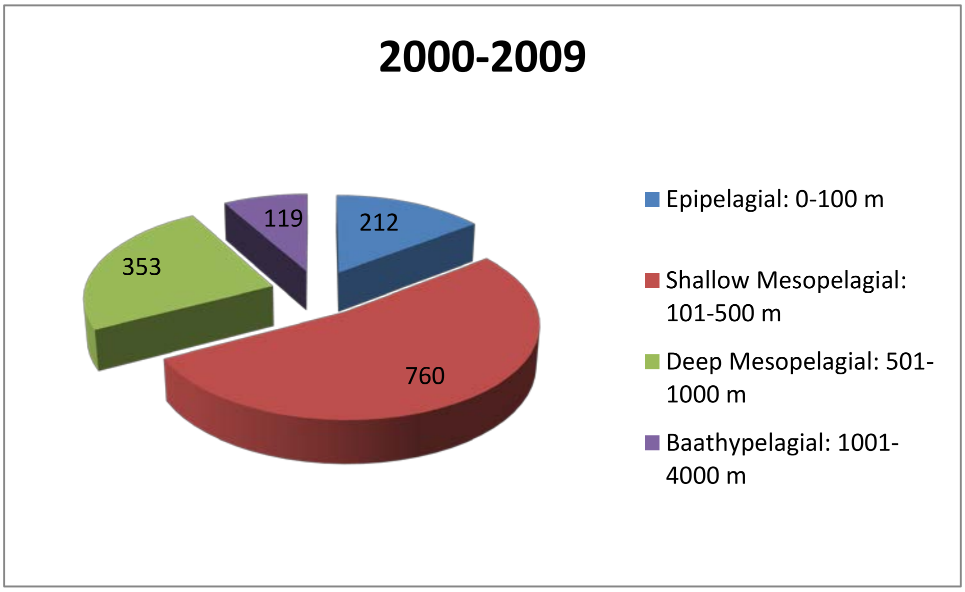
Types/depth	1990-1999	2000-2009	2010-2019	Total	percentage rate
number of types	409	1736	1091	3236	
number of types with depth	341	1444	623	2408	74,41%
Epipelagial: 0-100 m	39	212	184	435	18,06%
Shallow Mesopelagial: 101-500 m	134	760	174	1068	44,35%
Deep Mesopelagial: 501-1000 m	108	353	155	616	25,58%
Bathypelagial: 1001-4000 m	60	119	110	289	12,00%

Figure 7:

A: distribution of type specimen in bathymetric profiles in the years 1990-1999.



B: distribution of type specimen in bathymetric profiles in the years 2000-2009.



C: distribution of type specimen in bathymetric profiles in the years 2010-2018.

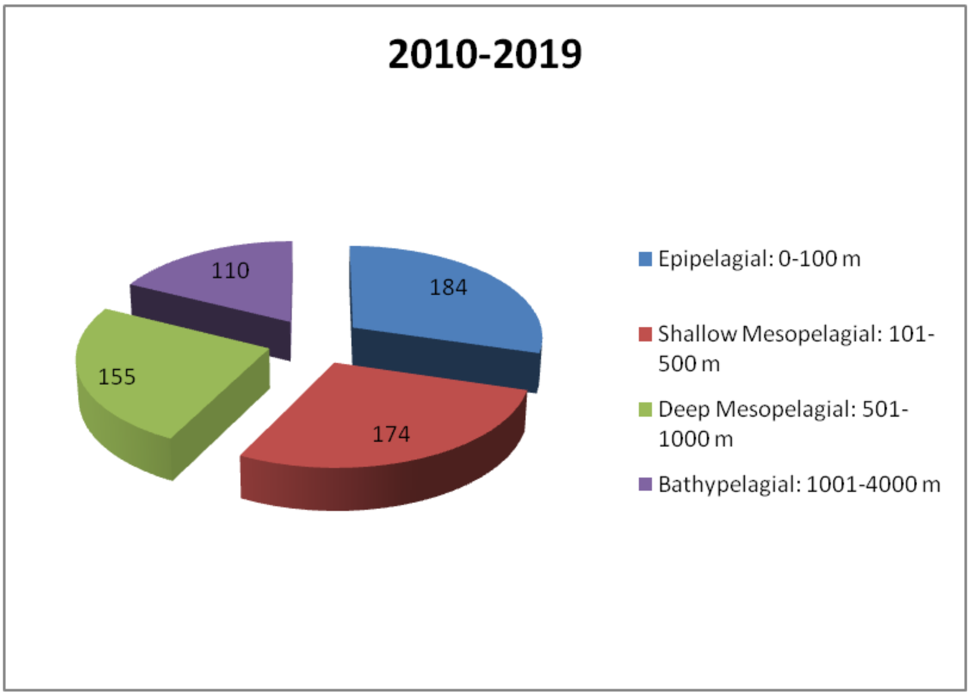
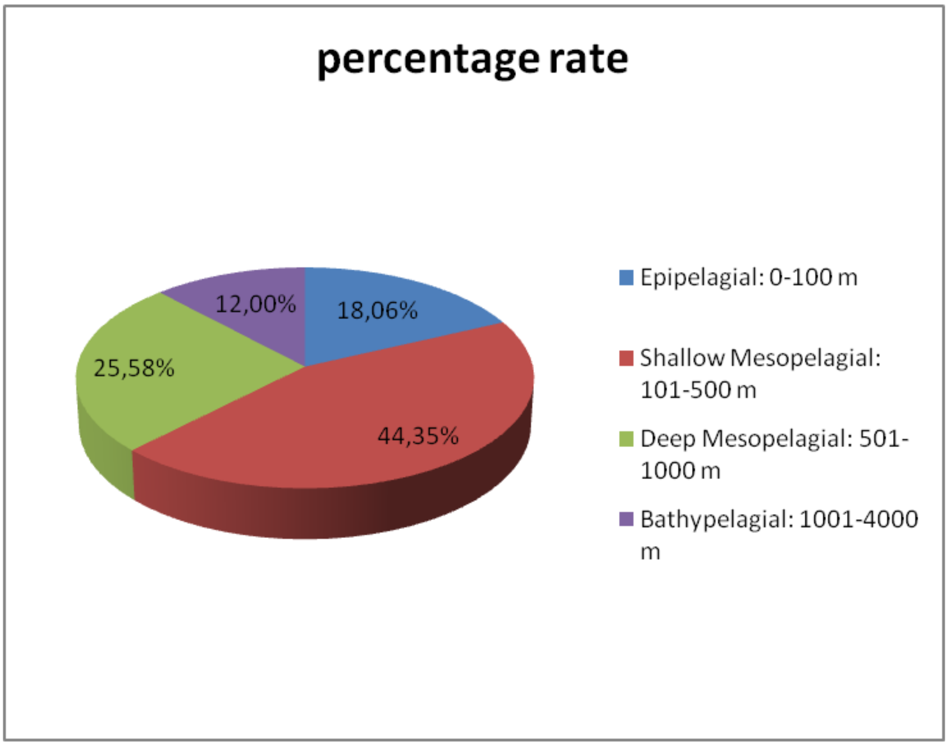


Figure 8: Percentage of type specimen in bathymetric profiles from 1990 to 2019.



3.2 Descriptions of extinct genera/species

3.2.1 List of new extinct genera

Antiquaobatis	STUMPF & KRIWET, 2019	(Rajiformes: incertae sedis)
Asflapristis	VILLALOBOS-SEGURA, UNDERWOOD, WARD & CLAESON, 2019	(Rajiformes: Ptychotrygonidae)
Diprosopovenator	STUMPF, SCHEER & KRIWET, 2019	(Carcharhiniformes: Pseudoscyliorhinidae)
Dykeius	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Chlamydoselachidae)
Florenceodon	CAPPETTA, MORRISON & ADNET, 2019	(Carcharhiniformes: Florenceodontidae)
Galagadon	GATES, GORSCAK & MAKOVICKY, 2019	(Orectolobiformes: incert. fam.)
Hessinodon	CAPPETTA, MORRISON & ADNET, 2019	(Squaliformes: Dalatiidae)
Komoksodon	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Komoksodontidae)
Lessiniabatis	MARRAMÀ, CARNEVALE, GIUSBERTI, NAYLOR & KRIWET, 2019	(Myliobatiformes: incertae sedis)
Marambioraja	ENGELBRECHT, MORS, REGUERO & KRIWET, 2019	(Rajiformes: Rajidae)
Mesetaraja	ENGELBRECHT, MORS, REGUERO & KRIWET, 2019	(Rajiformes: Rajidae)
Ostarriraja	MARRAMA, SCHULTZ & KRIWET, 2019	(Rajiformes: incert. fam.)
Ottangodus	POPOV, DELSATE & FELTEN, 2019	(Rajiformes: Rajidae)
Protoheptranchias	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Hexanchidae)
Pseudabdounia	EBERSOLE, CICIMURRI & STRINGER, 2019	(Carcharhiniformes: Carcharhinidae)
Rolfodon	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Chlamydoselachidae)
Tlalocbatos	BRITO, VILLALOBOS-SEGURAB & ALVARADO-ORTEGA, 2019	(Rhinopristiformes: incert. fam.)
Xampylodon	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Hexanchidae)

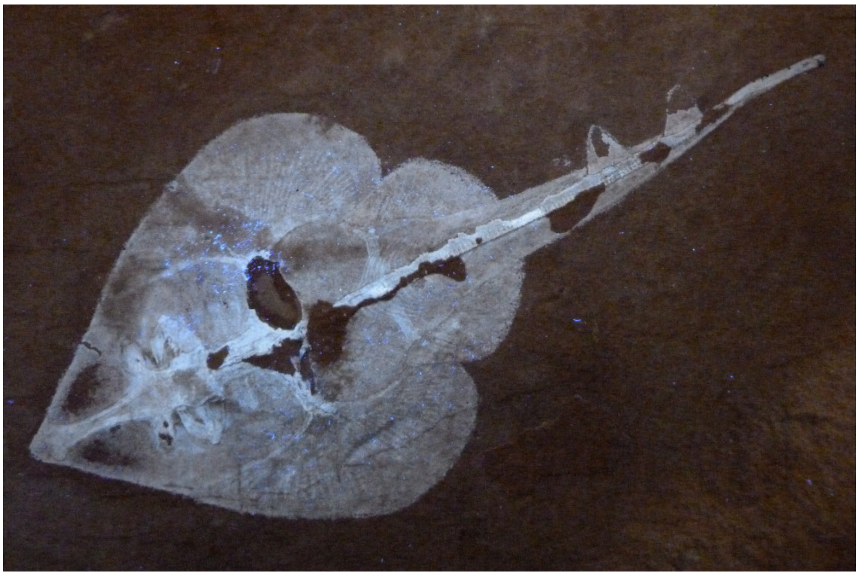
3.2.2 List of new extinct species

Antiquaobatis grimmenensis	STUMPF & KRIWET, 2019	(Rajiformes: incertae sedis)
Asflapristis cristadentis	VILLALOBOS-SEGURA, UNDERWOOD, WARD & CLAESON, 2019	(Rajiformes: Ptychotrygonidae)
Cantioscyllium clementsi	CASE, COOK, KIGHTLINGER & BORODIN, 2019	(Orectolobiformes: Ginglymostomatidae)
Carcharhinus mancinae	EBERSOLE, CICIMURRI & STRINGER, 2019	(Carcharhiniformes: Carcharhinidae)
Carcharhinus underwoodi	SAMONDS, ANDRIANAVALONA, WALLETT, ZALMOUT & WARD, 2019	(Carcharhiniformes: Carcharhinidae)
Carcharias dominguei	CAPPETTA, MORRISON & ADNET, 2019	(Lamniformes: Carchariidae)
Centrosqualus mustardi	CAPPETTA, MORRISON & ADNET, 2019	(Squaliformes: Squalidae)
Chlamydoselachus balli	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Chlamydoselachidae)
Cretalamna feldmanni	HOGANSON, ERICKSON & HOLLAND, 2019	(Lamniformes: Otodontidae)
Cretodus houghtonorum	SHIMADA & EVERHART, 2019	(Lamniformes: Cretoxyrhinidae)
Dasyatis northdakotaensis	HOGANSON, ERICKSON & HOLLAND, 2019	(Myliobatiformes: Dasyatidae)
Diprosopovenator hilperti	STUMPF, SCHEER & KRIWET, 2019	(Carcharhiniformes: Pseudoscyliorhinidae)
Dykeius garethi	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Chlamydoselachidae)
Florenceodon johnyi	CAPPETTA, MORRISON & ADNET, 2019	(Carcharhiniformes: Florenceodontidae)
Galagadon nordquistae	GATES, GORSCAK & MAKOVICKY, 2019	(Orectolobiformes: incert. fam.)
Hessinodon wardi	CAPPETTA, MORRISON & ADNET, 2019	(Squaliformes: Dalatiidae)
Hypolophites beckeri	MAISCH, 2019	(Myliobatiformes: Dasyatidae)
Igdabatis marmii	BLANCO, 2019	(Myliobatiformes: Myliobatidae)
Isogomphodon aikenensis	CICIMURRI & KNIGHT, 2019	(Carcharhiniformes: Carcharhinidae)
Komoksodon kwutchakuth	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Komoksodontidae)
Lessiniabatis aenigmatica	MARRAMÀ, CARNEVALE, GIUSBERTI, NAYLOR & KRIWET, 2019	(Myliobatiformes: incertae sedis)
Marambioraja leiostemma	ENGELBRECHT, MORS, REGUERO & KRIWET, 2019	(Rajiformes: Rajidae)
Mesetaraja maleficapelli	ENGELBRECHT, MORS, REGUERO & KRIWET, 2019	(Rajiformes: Rajidae)

Myledaphus araucanus	OTERO, 2019	(Rhinopristiformes: Rhinobatidae)
Myliobatis foxhillsensis	HOGANSON, ERICKSON & HOLLAND, 2019	(Myliobatiformes: Myliobatidae)
Odontorhytis bahariensis	SALAME & ASAN, 2019	(incert. sedis: incert. fam.)
Ostarriraja parva	MARRAMA, SCHULTZ & KRIWET, 2019	(Rajiformes: incert. fam.)
Ottangodus lotharingiae	POPOV, DELSATE & FELTEN, 2019	(Rajiformes: Rajidae)
Paraorthacodus rossi	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Paraorthacodontidae)
Phoebodus saidselachus	FREY, COATES, GINTER, HAIRAPETIAN, RÜCKLIN, JERJEN & KLUG, 2019	(Phoebodontiformes: Phoebodontidae)
Pristiophorus humboldti	VILLAFAÑA, NIELSEN, KLUG & KRIWET, 2019	(Pristiophoriformes: Pristiophoridae)
Pristiophorus pricei	CAPPETTA, MORRISON & ADNET, 2019	(Pristiophoriformes: Pristiophoridae)
Pristiophorus smithi	CAPPETTA, MORRISON & ADNET, 2019	(Pristiophoriformes: Pristiophoridae)
Protocentrophorus steviae	CAPPETTA, MORRISON & ADNET, 2019	(Squaliformes: Centrophoridae)
Protoheptranchias lowei	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Hexanchidae)
Protolamna ricaurtei	CARRILLO-BRICEÑO, PARRA & LUQUE, 2019	(Lamniformes: Eoptolamnidae)
Ptychotrygon rostrispatula	VILLALOBOS-SEGURA, UNDERWOOD & WARD, 2019	(Rajiformes: Ptychotrygonidae)
Raja amphitrita	ENGELBRECHT, MORS, REGUERO & KRIWET, 2019	(Rajiformes: Rajidae)
Raja manitaria	ENGELBRECHT, MORS, REGUERO & KRIWET, 2019	(Rajiformes: Rajidae)
Rhinoscymnus clarki	CAPPETTA, MORRISON & ADNET, 2019	(Squaliformes: Somniosidae)
Rolfodon ludvigseni	CAPPETTA, MORRISON & ADNET, 2019	(Hexanchiformes: Chlamydoselachidae)
Scymnodalatias kazenobon	NISHIMATSU & UJIHARA, 2019	(Squaliformes: Somniosidae)
Squalicorax acutus	SIVERSSON, COOK, RYAN, WATKINS, TATARNIC, DOWNES & NEWBREY, 2019	(Lamniformes: Anacoracidae)
Squalicorax bazzii	SIVERSSON, COOK, RYAN, WATKINS, TATARNIC, DOWNES & NEWBREY, 2019	(Lamniformes: Anacoracidae)
Squalicorax mutabilis	SIVERSSON, COOK, RYAN, WATKINS, TATARNIC, DOWNES & NEWBREY, 2019	(Lamniformes: Anacoracidae)
Squaliodalatias savoiei	CAPPETTA, MORRISON & ADNET, 2019	(Squaliformes: Dalatiidae)
Squalus nicholsae	CAPPETTA, MORRISON & ADNET, 2019	(Squaliformes: Squalidae)

Synechodus dereki	CAPPETTA, MORRISON & ADNET, 2019	(Synechodontiformes: Palaeospinacidae)
Tlalocbatos applegatei	BRITO, VILLALOBOS-SEGURAB & ALVARADO-ORTEGA, 2019	(Rhinopristiformes: incert. fam.)

3.2.3 Papers of new extinct genera/species



BRITO, P.M. & VILLALOBOS-SEGURAB, E. & ALVARADO-ORTEGA, J. (2019): A new early cretaceous guitarfish (Chondrichthyes, Batoidea) from the Tlayúa Formation, Puebla, Mexico. *Journal of South American Earth Sciences, 90: 155-161*

New genus: *Tlalocbatos*

New species: *Tlalocbatos applegatei*

Abstract: A new species of “guitarfish" from the Lower Cretaceous Tlayúa Formation of Puebla, Mexico is here described as †*Tlalocbatos applegatei* gen. et sp. nov. The new species is based on a nearly complete articulated specimen and represents the first chondrichthyan from this formation. The inclusion of a new character and two additional taxa into a phylogenetic analysis based on previous studies generates a novel phylogenetic hypothesis of batoid phylogeny. Paraphyly of the “guitarfishes” is corroborated, although a new clade was recovered comprising the modern Platyrhinidae plus †*Britobatos primarmatus* as the sister group of the node formed by †*Stahlraja*, †*Tlalocbatos*, plus the Trygonorrhinidae. †*Tlalocbatus* differs from other batoids by the following combination of characters: nasal capsules with horn-like anterior processes; homodont dentition; presence of a well-developed median uvula; lateral uvulae not differentiated; pectoral propterygium, extending as far as the anterior part of the nasal capsules; two radials articulating directly with the scapulocoracoid, between the mesopterygium and the metapterygium; two dorso-lateral nuchal cartilages, unfused with the synarcual; and an elevated number of post-synarcual centra (115–118). The distribution of †*Stahlraja*(†*Tlalocbatos* (trygonorrhinids)), suggests that this clade originated in the western part of the Tethys-Caribbean region with a later dispersion westward towards the Pacific.

GATES, T.A. & GORSCAK, E. & MAKOVICKY, P.J. (2019): New sharks and other chondrichthyans from the latest Maastrichtian (Late Cretaceous) of North America. *Journal of Paleontology, in press*

New genus: *Galagadon*

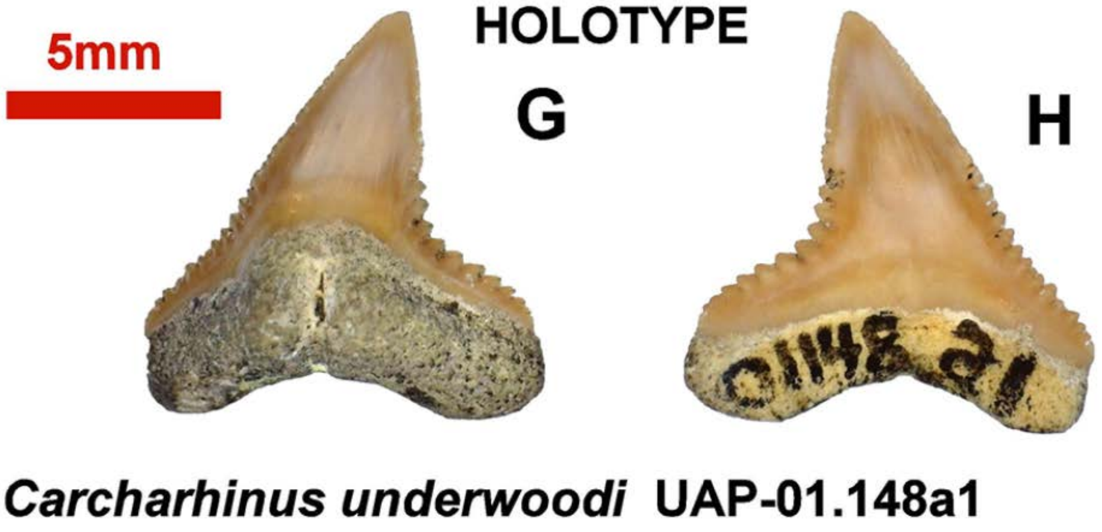
New species: *Galagadon nordquistae*

Abstract: Cretaceous aquatic ecosystems were amazingly diverse, containing most clades of extant aquatic vertebrates as well as an array of sharks and rays not present today. Here we report on the chondrichthyan fauna from the late Maastrichtian site that yielded the *Tyrannosaurus rex*skeleton FMNH PF 2081 ("SUE"). Significant among the recovered fauna is an unidentified species of carcharhinid shark that adds to the fossil record of this family in the Cretaceous, aligning with estimates from molecular evidence of clade originations. Additionally, a new orectolobiform shark, here named *Galagadon nordquistae* n. gen. n. sp., is diagnosed on the basis on several autapomorphies from over two-dozen teeth. Common chondrichthyan species found at the "SUE" locality include *Lonchidion selachos* and *Myledaphus pustulosus*. Two phylogenetic analyses (Maximum Parsimony and Bayesian Inference) based on twelve original dental character traits combined with 136 morphological traits from a prior study of 28 fossil and extant taxa, posited *Galagadon* n. gen. in two distinct positions: as part of a clade inclusive of the fossil species *Cretorectolobus olsoni* and *Cederstroemia triangulata* plus extant orectolobids from the Maximum Parsimony analysis; and as the sister taxon to all extant hemiscyllids from the Bayesian Inference. Model-based biogeographical reconstructions based on both optimal trees suggest rapid island hopping-style dispersal from the Western Pacific to the Western Interior Seaway of North America where *Galagadon* n. gen. lived. Alternatively, the next preferred model posits a broader, near-global distribution of Orectolobiformes with *Galagadon*n. gen. dispersing into its geographic position from this large ancestral range.

NISHIMATSU, K. & UJIHARA, A. (2019): A New Deep-Sea Shark *Scymnodalatias kazenobon* (Squaliformes, Somniosidae) from the Miocene Yatsuo Group in Central Japan. *Paleontological Research, 23 (1): 23-29*

New species: *Scymnodalatias kazenobon*

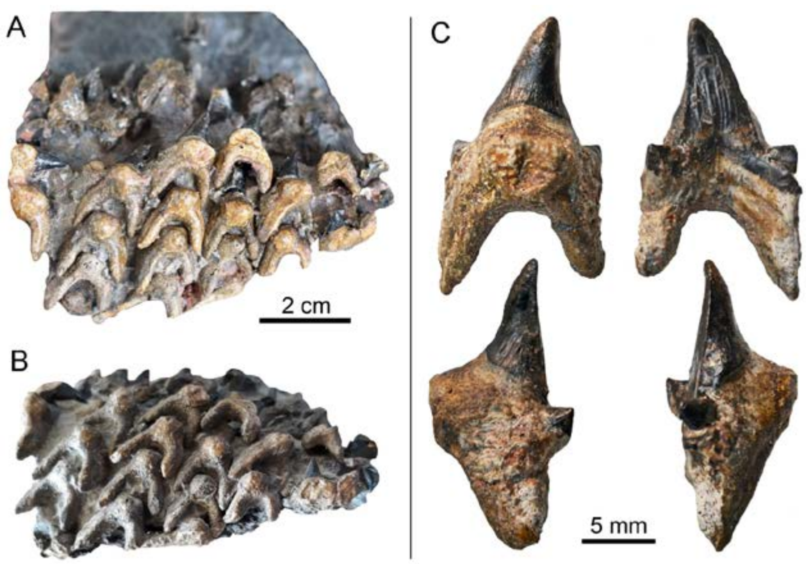
Abstract: A new deep-sea shark of the genus Scymnodalatias (Squaliformes, Somniosidae), S. kazenobon sp. nov., is described from the middle Miocene Yatsuo Group in Central Japan. This is the first fossil record of the genus Scymnodalatias from the Miocene strata and its first occurrence in the Pacific region. This discovery seems to indicate that major distributional changes occurred in the Pacific region sometime during the late Cenozoic era.



SAMONDS, K.E. & ANDRIANAVALONA, T.H. & WALLETT, L.A. & ZALMOUT, I.S. & WARD, D.J. (2019): A middle - late Eocene neoselachian assemblage from nearshore marine deposits, Mahajanga Basin, northwestern Madagascar. *PLoS ONE, 14 (2): e0211789*

New species: *Carcharhinus underwoodi*

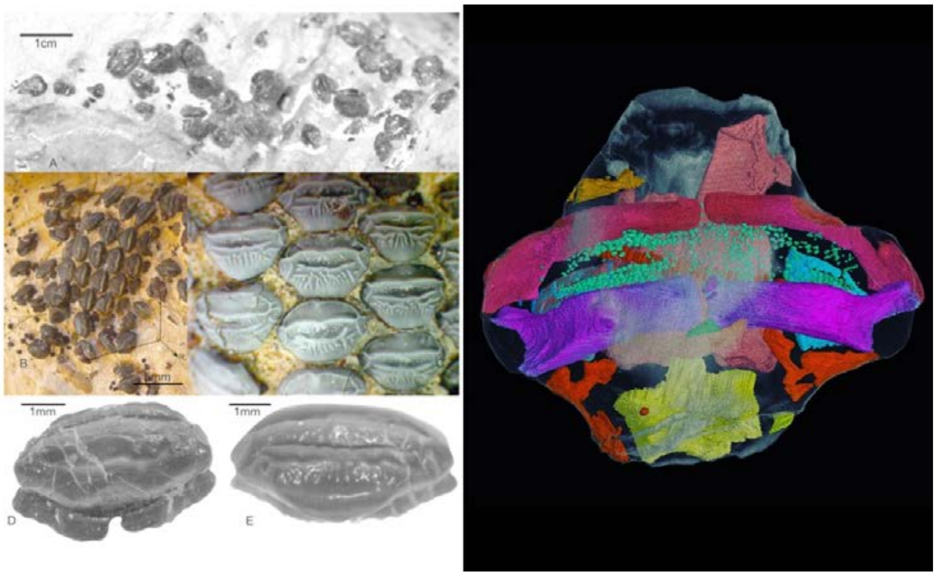
Abstract: We report here the first neoselachian fossil fauna from Eocene nearshore marine deposits of the Mahajanga Basin, northwestern Madagascar. The fauna includes seven species of shark: *Nebrius blankenhorni*, *Brachycarcharias koerti*, *Galeocerdo eaglesomei*, two species of *Carcharhinus* (one of which is described as a new species), *Physogaleus*, *Rhizoprionodon and Sphyrna*. Three species of rays were also recovered: *Pristis*, *Myliobatis* and an undetermined dasyatid ray. This fauna represents the first Cenozoic neoselachian fossil record from the Eocene of Madagascar and broadens our understanding of their evolutionary and biogeographic history in the southern hemisphere during this time. Although the diversity of the genera and species of the fauna is very low, the age and similarity of genera to those in Congo, west Africa, Arabia, Asia, Europe, and North, Central, and South America suggests that these genera were broadly distributed and diverse within the shallow marine settings of the Tethyan and southern provinces during middle and late Eocene.



CARRILLO-BRICEÑO, J.D. & PARRA, J.D. & LUQUE, J. (2019): A new lamniform shark *Protolamna ricaurtei* sp. nov. from the Lower Cretaceous of Colombia. *Cretaceous Research, 95: 336-340*

New species: *Protolamna ricaurtei*

Abstract: The Lower Cretaceous record of lamniforms from South America is scarce and poorly known, containing only two reports of isolated teeth from the upper Hauterivian of Argentina and the Albian of Peru. Here, we describe a partial articulated tooth set referable to †*Protolamna ricaurtei* sp. nov. from the upper Barremian–lower Aptiandeposits of the Paja Formation (Andes of Colombia). The new species corresponds to one of the oldest fossil lamniforms to date reported from South America. This articulated tooth set is the only known for the family †Pseudoscapanorhynchidae, and possibly the oldest in its type for a lamniform from the Lower Cretaceous. Our findings offer new insights in to the lamniform paleodiversity of the northwestern margin of Gondwanaduring the Early Cretaceous.



VILLALOBOS-SEGURA, E. & UNDERWOOD, C.J. & WARD, D.J. & CLAESON, K.M. (2019): The first three-dimensional fossils of Cretaceous sclerorhynchid sawfish: *Asflapristis cristadentis* gen. et sp. nov., and implications for the phylogenetic relations of the Sclerorhynchoidei (Chondrichthyes). *Journal of Systematic Palaeontology, in press*

New genus: *Asflapristis*

New species: *Asflapristis cristadentis*

Abstract: A new fossil batoid (ray), *Asflapristis cristadentis* gen. et sp. nov., is described from six exceptionally well-preserved, three-dimensional skeletal remains from the Turonian (Late Cretaceous) of Morocco. Mechanical and acid preparation and computed tomographic scanning of these specimens reveal details of much of the proximal skeleton, especially the skull, synarcual and pectoral skeleton, with only the more distal parts of the skeleton missing. These fossils represent a relatively large animal (62 cm preserved length, estimated total length approximately 2 metres) possessing a robust rostrum that lacks enlarged rostral denticles. It has a narrow and small chondrocranium with jaws that are relatively large compared to the rest of the skull and robust with highly ornamented teeth that lack cusps. The branchial skeleton shows a large second hypobranchial without an anterior process, which was probably fused to the basibranchial as in other sclerorhynchoids. The synarcual is large and lacks centra through its entire length, with no direct connection to the pectoral girdle observed. Pectoral fins probably possessed enlarged proximal elements (propterygium, mesopterygium and metapterygium); the articulation facet between the coracoid and the pectoral elements

was reduced. A phylogenetic analysis using both parsimony and Bayesian methods was performed incorporating this new taxon. Both analyses recovered a phylogenetic topology that places the sclerorhynchoids in a close relation to rajoids and clearly separated from the morphologically similar Pristidae within the Rhinopristiformes. With respect to the extant taxa, the phylogenies generated are similar to that obtained from molecular analysis of modern batoids. The palaeoecological implication of this discovery suggests that the Asfla assemblage was not from a 'normal' open carbonate shelf but rather a restricted environment favouring a low-diversity chondrichthyan fauna.

STUMPF, S. & SCHEER, U. & KRIWET, J. (2019): A new genus and species of extinct ground shark, †*Diprosopovenator hilperti*, gen. et sp. nov. (Carcharhiniformes, †Pseudoscyliorhinidae, fam. nov.), from the Upper Cretaceous of Germany. *Journal of Vertebrate Paleontology, in press*

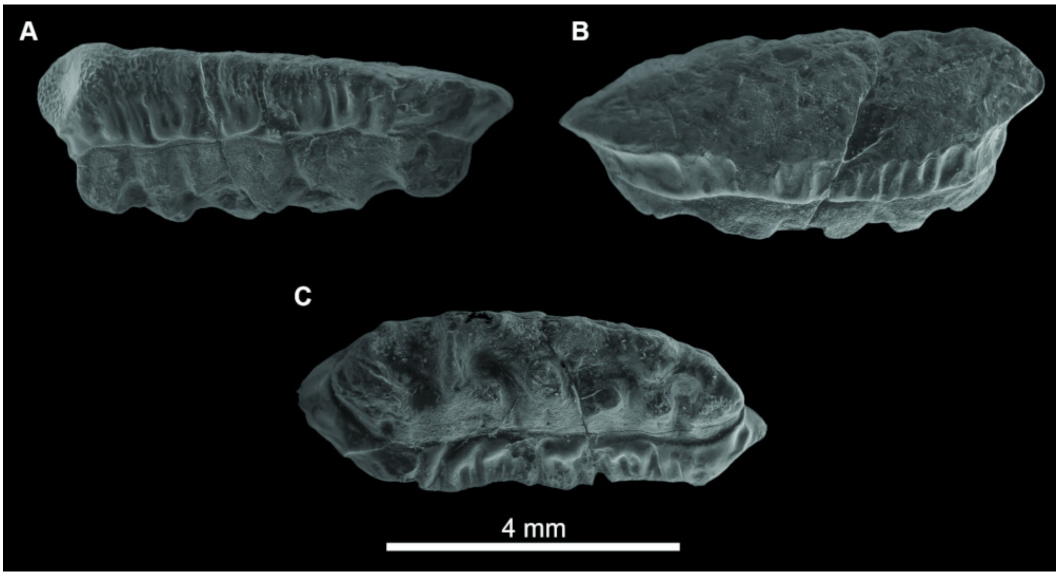
New species: *Diprosopovenator hilperti*

Abstract: We describe a new genus and species of extinct ground shark, †*Diprosopovenator hilperti*, gen. et sp. nov. (Elasmobranchii, Carcharhiniformes), based on a single incomplete skeleton with dentition recovered from basinal marine late Cenomanian (*Metoicoceras geslinianum* ammonite zone) organic-rich deposits of northern Germany. The new carcharhiniform is characterized by a unique combination of dental morphologies, indicating close architectural resemblance to the family Scyliorhinidae (catsharks). However, the very distinct tooth root morphology readily separates the new taxon from all other scyliorhinids. The extinct Cretaceous carcharhiniform †*Pseudoscyliorhinus* (represented by †*Ps*. *schwarzhansi* and †*Ps*. *reussi*) shares tooth root morphologies and vascularization patterns with †*Diprosopovenator*, gen. nov. We hypothesize that these two sharks form part of an extinct group of carcharhiniforms characterized by a distinct root morphology (viz., low hemiaulacorhize roots with very flat and strongly flared basal faces protruding below the crown labially and mesiodistally and with a well-developed central labiobasal notch). Consequently, we propose a new family of Late Cretaceous carcharhiniforms, †Pseudoscyliorhinidae, fam. nov., to include the new taxon, as well as †*Pseudoscyliorhinus*. †Pseudoscyliorhinidae, fam. nov., shows a wide European distribution during the Late Cretaceous, ranging from the early Cenomanian to the late Campanian. The longevity of Scyliorhinidae, with a fossil record extending back into the Middle Jurassic, however, remains ambiguous and unresolved; therefore, it may be best to regard the assignment of fossil taxa to Scyliorhinidae as currently uncertain pending further taxonomic work.

SIVERSSON, M. & COOK, T.D. & RYAN, H.E. & WATKINS, D.K. & TATARNIC, N.J. & DOWNES, P.J. & NEWBREY, M.G. (2019): Anacoracid sharks and calcareous nannofossil stratigraphy of the mid-Cretaceous "upper' Gearle Siltstone and Haycock Marl in the lower Murchison River area, Western Australia. *Alcheringa, 43 (1): 85-113*

New species: *Squalicorax acutus, Squalicorax bazzii, Squalicorax mutabilis*

Abstract: Extensive bulk sampling over the past 20 years and greatly improved stratigraphic control permitted a meaningful revision of previously described anacoracid sharks from the 'upper' Gearle Siltstone and lower Haycock Marl in the lower Murchison River area, Western Australia. Isolated teeth of anacoracids are rare in the lower three (Beds 1–3) of four stratigraphic units of the 'upper' Gearle Siltstone but relatively common in the uppermost layer (Bed 4) and in the lower part of the overlying Haycock Marl. On the basis of calcareous nannofossils, Beds 1 and 2 of the 'upper' Gearle Siltstone can be placed in the uppermost upper Albian calcareous nannofossil Subzone CC9b whereas Bed 3 can be referred to the lowermost Cenomanian CC9c Subzone. Bed 1 yielded fragments of strongly serrated anacoracid teeth as well as a single, smooth-edged tooth. The samples from Beds 2 and 3 contained a few small fragments of serrated anacoracid teeth. Bed 4 is barren of calcareous nannofossils but the presence of a dentally advanced tooth of the cosmopolitan lamniform genus *Cretoxyrhina* in combination with the age of the overlying Haycock Marl indicate deposition within the younger half of the Cenomanian. The unit produced teeth of two anacoracids; *Squalicorax acutus* sp. nov. and *S. bazzii* sp. nov. The basal, laminated part of the Haycock Marl is placed in the uppermost upper Cenomanian part of CC10b. It yielded *Squalicorax mutabilis* sp. nov. and *S.* aff. *S. bernardezi*. Exceptionally well-preserved teeth of the former species span a 5:1 size ratio range for teeth of comparable jaw position. The teeth reveal strong ontogenetic heterodonty with a large increase in the relative size of the main cusp with age and the transition from a vertical distal heel of the crown in very young juveniles to a sub-horizontal, well demarcated heel in 'adult' teeth. An isolated phosphatic lens in the lower part of the Haycock Marl produced calcareous nannofossils indicative of the CC10b SubZone, most likely the lowermost lower Turonian part. It contains teeth of *Squalicorax mutabilis* sp. nov., *S*. aff. *S. bernardezi*, and *S*. sp. C.



BLANCO, A. (2019): *Igdabatis marmii* sp. nov. (Myliobatiformes) from the lower Maastrichtian (Upper Cretaceous) of north-eastern Spain: an Ibero-Armorican origin for a Gondwanan batoid. *Journal of Systematic Palaeontology, 17 (10): 865-879*

New species: *Igdabatis marmii*

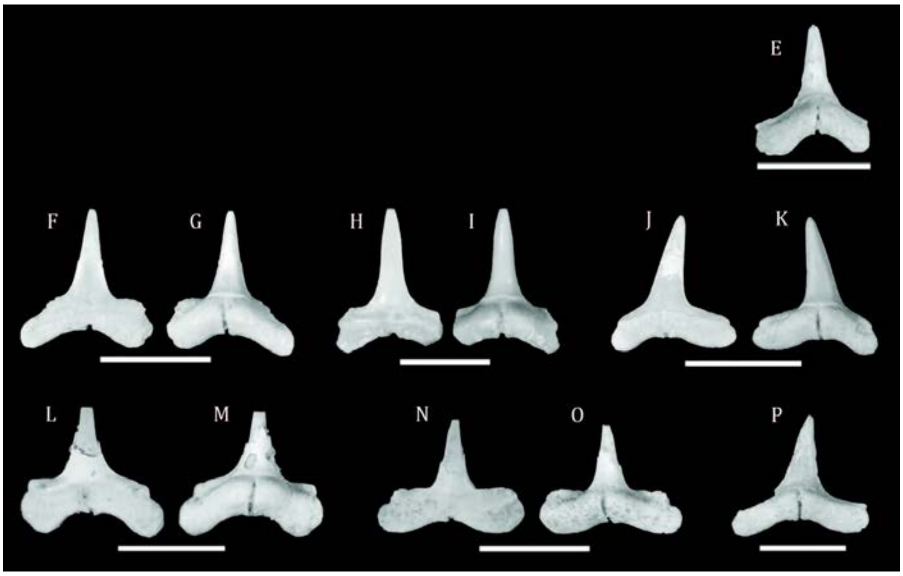
Abstract: Microvertebrate fossil assemblages (chondrichthyans, osteichthyans, lissamphibians and squamates) from the Campanian and Maastrichtian of south-western Europe include taxa with very different palaeobiogeographical affinities. However, most of these biogeographical histories remain unclear. As inhabitants of shallow marine waters, batoids are considered good palaeobiogeographical indicators that could reveal connections between continental platforms. *Igdabatis* is a stingray (Myliobatiformes) with an abundant Gondwanan fossil record, whereas its occurrence in the Ibero-Armorican landmass is intriguing. In this paper, a new species of *Igdabatis* – *Igdabatis marmii* sp. nov. – is reported from the lower Maastrichtian of Spain. Based on this new record, the phylogenetic relationships of Myliobatiformes are assessed, including *Igdabatis* taxa for first time. In addition, three new morphological characters are proposed based on the diagnoses of the different species and added to the dataset. The palaeobiogeographical events that these stingrays underwent during their speciation were explored through a Statistical Dispersal-Vicariance Analysis (S-DIVA) performed in RASP 2.1. The phylogenetic analysis suggests a highly nested position within Myliobatidae for the genus *Igdabatis*; and the new species was recovered as the most basal taxon in the clade. The S-DIVA results point to an Ibero-Armorican ancestral area for *Igdabatis*, from where its species diverged by a combination of vicariant and dispersal events. Both phylogenetic and palaeobiogeographical analyses were congruent with occurrences in the fossil record. Results and fossil evidence allow the proposal of a dispersal route between European and Gondwanan landmasses for these stingrays. The dispersal of *Igdabatis* between Ibero-Armorica and India during the Late Cretaceous was promoted by the proximity of the European and African continental platforms and then by the Kohistan-Ladakh island arc.

MARRAMA, G. & SCHULTZ, O. & KRIWET, J. (2019): A new Miocene skate from the Central Paratethys (Upper Austria): the first unambiguous skeletal record for the Rajiformes (Chondrichthyes: Batomorphii). *Journal of Systematic Palaeontology, 17 (10): 937-960*

New genus: *Ostarriraja*

New species: *Ostarriraja parva*

Abstract: A new fossil skate, Ostarriraja parva gen. et sp. nov., represented by a single partial articulated skeleton collected from the early Miocene fish-bearing strata of Upper Austria, is described here in detail. This taxon exhibits a unique combination of skeletal and dental features (e.g. nasal capsules broad and oval; presence of pectoral arch; compound radial articulated with single radial segments in serial fashion; separated pelvic girdle condyles; reduced catenated calcification of radials; about 86 pectoral radials; 20–21 pelvic-fin radials; 65–70 predorsal vertebrae) that clearly support its assignment to a new genus of the order Rajiformes, and the phylogenetic analyses reveal its basal position within the group. The comparison between Ostarriraja and the holomorphic batoids from Late Cretaceous of Lebanon traditionally aligned with skates concurs to suggest that this Neogene occurrence represents unquestionably the first known skeletal record for the group. The morphological and phylogenetic affinities of Ostarriraja with the living skates suggest a close association of this taxon with the temperate-cold water environments hypothesized for the Central Paratethys during the early Miocene.



CICIMURRI, D.J. & KNIGHT, J.L. (2019): Late Eocene (Priabonian) elasmobranchs from the Dry Branch Formation (Barnwell Group) of Aiken County, South Carolina, USA. *PaleoBios, 36: 1–31*

New species: *Isogomphodon aikenensis*

Abstract: A survey of the Eocene (Priabonian) Dry Branch Formation exposed in Aiken County, South Carolina, resulted in the collection of thousands of fossil teeth and bone fragments. Two sites located near the city of Aiken proved to be particularly productive, and 24 species of elasmobranchs, 11 osteichthyans, and three reptiles (one crocodilian and two turtles) have been identified. Herein we focus on the elasmobranch species (17 sharks and seven rays) that are part of the assemblage, which includes a new species of daggernose shark, *Isogomphodon aikenensis* n. sp. Cicimurri and Knight. The fossils are derived from the upper part of the Dry Branch Formation, and the fossiliferous strata accumulated within a high energy nearshore marine depositional environment that was influenced by a river system. Based on the vertebrate and invertebrate fossils we identified, the water depth was less than 40 m, and surface water temperature was at least 22° C . Elasmobranch species composition is similar to other late Eocene elasmobranch assemblages reported from the Gulf and Atlantic Coastal plains, particularly Georgia, and several of the taxa indicate affinities to the Tethyan region.

POPOV, E.V. & DELSATE, D. & FELTEN, R. (2019): A New Callorhinchid Genus (Holocephali, Chimaeroidei) from the Early Bajocian of Ottange-Rumelange, on the Luxembourg-French Border. *Paleontological Research, 23 (3): 220-230*

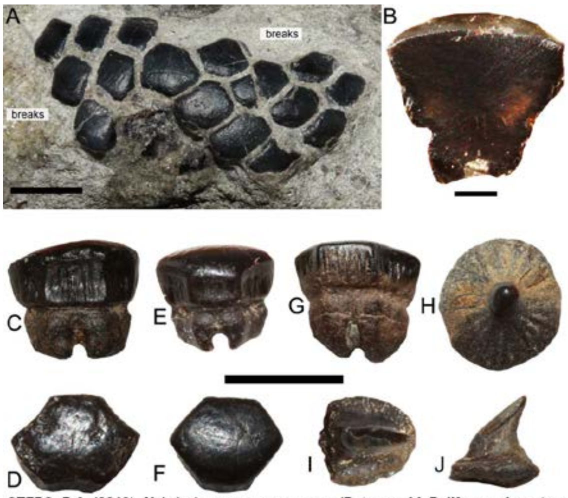
New species: *Ottangodus lotharingiae*

Abstract: An incomplete chimaeroid (Holocephali, Chimaeroidei) mandibular dental plate from the early Bajocian (Humphriesianum Zone) of Ottange-Rumelange, on the Luxembourg-French border, is described as a new genus and species of callorhinchid fish *Ottangodus lotharingiae* gen. et sp. nov. Comparison of the described plate with other Jurassic chimaeriform fish (both myricanthid and chimaeroid) mandibular plates shows relationships with callorhinchids and in turn close relationships with the genus *Pachymylus* Woodward, known from the Callovian of England. The plate of the new genus shows a set of primitive characters for chimaeroids (very high descending lamina, low oral part of the plate, large centrally placed median tritor occupying most of the oral part of the plate and an absence of mesio-labial system of the tritors) and could thus belong to a basal Chimaeroidei taxon. This is the first record of the Chimaeroidei from the Jurassic of Lorraine and the fourth chimaeriform genus known from the Mesozoic of the region.

HOGANSON, J.W. & ERICKSON, M. & HOLLAND, F.D. (2019): Chondrichthyan and Osteichthyan Paleofaunas from the Cretaceous (Late Maastrichtian) Fox Hills Formation of North Dakota, USA: Paleoecology, Paleogeography, and Extinction. *Bulletins of American Paleontology, 398: 1-94*

New species: *Cretalamna feldmanni, Dasyatis northdakotaensis, Myliobatis foxhillsensis*

Abstract: As part of a study of the Vertebrata found in the Late Cretaceous (Early Maastrichtian to Middle Late Maastrichtian) Fox Hills Formation, 48 sites in western and central North Dakota were collected to interpret the chondrichthyan and osteichthyan paleofaunas. Based mostly on teeth, 19 shark species, 16 skate and ray species, and one ratfish species were recognized. Of those, three taxa are new, including Cretalamna feldmanni n. sp., "Myliobatis" foxhillsensis n. sp., and Dasyatis northdakotaensis n. sp. New chondrichthyan species occurrences for the Fox Hills Formation include: *Squalus ballingsloevensis, Plicatoscyllium derameei, Cretorectolobus olsoni, Carcharias* cf. *C. tenuiplicatus, Cretalamna feldmanni* n. sp., *Paranomotodon toddi, Squalicorax pristodontus, Palaeogaleus navarroensis, Archaeotriakis rochelleae, Paraorthacodus andersoni, Synechodus turneri, Walteraja exigua, Dasyatis northdakotaensis* n. sp., *Rhombodus levis, "Myliobatis" foxhillsensis* n. sp., and morphotypes of placoid scales and dermal denticles. Twenty species of bony fishes were identified from teeth and other skeletal parts, two were vertebral morphospecies, two were based on scales, and four were recognized from otoliths. New osteichthyan occurrences in the Fox Hills Formation include: a lepisosteid, *Melvius* sp., *Cyclurus fragosus, Protosphyraena* sp., *Belonostomus longirostris, Xiphactinus vetus, Paratarpon?* sp., *Pollerspoeckia siegsdorfensis,* cf. *Bathylagus* sp., *Enchodus* cf. *E. ferox,* and *"Apogonidarum" maastrichtiensis*. The Fox Hills Formation is Early Maastrichtian in Bowman County, southwestern North Dakota. The Bowman County sites yielded the oldest fossils of this study. Sites in the Fox Hills type area in north-central South Dakota and south-central North Dakota are Middle Late Maastrichtian based on the presence of *Hoploscaphites nicolletii* and *Hoploscaphites nebrascensis* Ammonite Zones and the Wodehousia spinata Pollen Zone. Age relationships of these fossil sites suggest temporal range extensions for several of the Fox Hills fish taxa. Fox Hills fishes were derived from deep and shallow marine, brackish, and freshwater habitats. Five groupings were identified based on qualitative assessment of these habitat preferences. These groupings are: "offshore marine," "nearshore marine," "brackish water/estuarine–strong tidal influence," "brackish water/estuarine–weak tidal influence," and "riverine/lagoonal–strong freshwater influence." Tooth morphology and comparison to modern analogs indicate presence of the following feeding types: omnivore, general invertebrate, molluscivore, pelagic piscivore, benthic piscivore, and scavenger. Species representing all feeding types occur in each of the five habitat groupings. Feeding competition was thus partitioned by habitat preference. When coupled with paleogeographic distribution information, the Fox Hills fish fauna indicates that some taxa represent a recurring assemblage of species that have a "large-river delta" habitat preference, as found today on major deltas of most continents. Paleogeographic conditions in the Western Interior Seaway (WIS) were dominated by the physiographic conditions of the Hell Creek Delta and Dakota Isthmus complex, which is composed of lagoons, estuaries, and barrier island shorelines. The Fox Hills fish paleofauna includes taxa restricted to the WIS and those that also occurred in the Texas Gulf Coast, Mississippi Embayment, Atlantic Coastal Plain, Greenland, and Sweden. Pelagic, deep marine lamniform species were cosmopolitan and ranged to Europe and North Africa. The Fox Hills fish fauna is most similar to the fish faunas of the Maastrichtian Kemp Formation, Texas, Severn Formation, Maryland, and Navesink and New Egypt formations, New Jersey. The Fox Hills paleofauna documents fish extinction at the close of the Cretaceous. None of the 36 chondrichthyan species and none of the 20 osteichthyan species recovered from the Fox Hills Formation are found in the Paleocene worldwide. 58% of Fox Hills chondrichthyan and 77% of osteichthyan genera, and 20% of chondrichthyan and 33% of osteichthyan families, did not survive after the Cretaceous. Support for this interpretation is provided by comparison of the Fox Hills paleofauna to the Paleocene Cannonball Formation paleofauna in North Dakota. None of the 13 Cannonball chondrichthyan species, nor any of the four Cannonball osteichthyan species, occur in the Fox Hills Formation. Thirteen chondrichthyan genera (*Squatina, Squalus, Ginglymostoma, Carcharias, Odontaspis, Cretalamna, Palaeogaleus, Galeorhinus, Paraothacodus, Synechodus, Myliobatis, Dasyatis,* and *Ischyodus*) range across the K-Pg boundary.

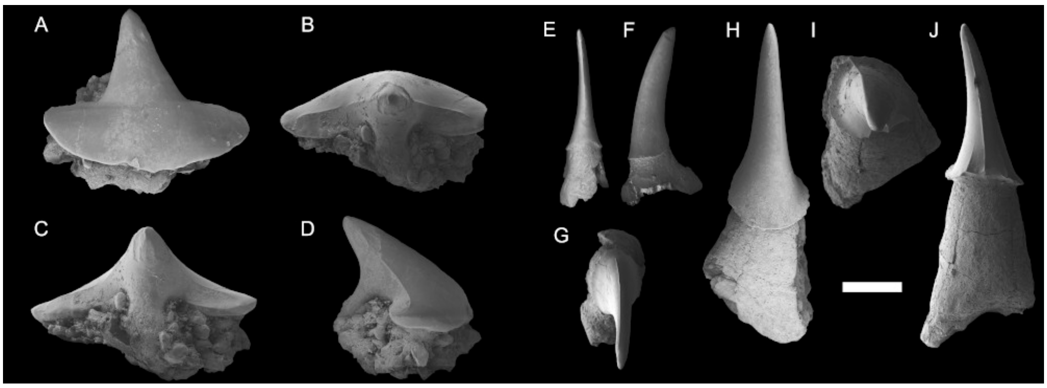


OTERO, R.A. (2019): *Myledaphus araucanus* sp. nov. (Batomorphi, Rajiformes incertae sedis), a new Late Cretaceous ray from the austral Pacific, and first occurrence of the genus in the Southern Hemisphere. Cretaceous Research, 100: 82-90

OTERO, R.A. (2019): *Myledaphus araucanus* sp. nov. (Batomorphi, Rajiformes incertae sedis), a new Late Cretaceous ray from the austral Pacific, and first occurrence of the genus in the Southern Hemisphere. *Cretaceous Research, 100: 82-90*

New species: *Myledaphus araucanus*

Abstract: Isolated ray teeth have been frequently recorded in several Maastrichtian units of the Arauco Basin of central Chile. Up to now, the taxonomy of these specimens were broadly discussed, however, their historical taxonomic determinations lack good support. This contribution provides new evidence regarding the taxonomy, paleobiogeography and chronostratigraphic distribution of this material. For the first time, a partially articulated dental pavement is presented here. Histological analysis indicates affinities to Rajiformes, while morphologic features reveal affinities to the genus *Myledaphus*. The differences justify the erection of a new species, *Myledaphus araucanus* sp. nov. *Myledaphus* occurs in central Chile, being documented in three localities, with a widespread distribution along the Arauco Basin, ranging the lower Maastrichtian to the upper Maastrichtian, and having a latitudinal range between 33°21′ to 36°45′S. The presence of this genus in the southeastern Pacific during the Maastrichtian contrasts with the morphologically similar genus *Hypolophodon* previously documented from the Maastrichtian–Paleocene of the southwestern Atlantic. Such segregation between both oceans of southern South America suggests different biogeographic patterns for the marine fauna, reinforcing previous faunal segregations already observed among marine reptiles.



VILLAFAÑA, J.A. & NIELSEN, S.N. & KLUG, S. & KRIWET, J. (2019): Early Miocene cartilaginous fishes (Chondrichthyes: Holocephali, Elasmobranchii) from Chile: Diversity and palaeobiogeographic implications. *Journal of South American Earth Sciences, in press*

New species: *Pristiophorus humboldti*

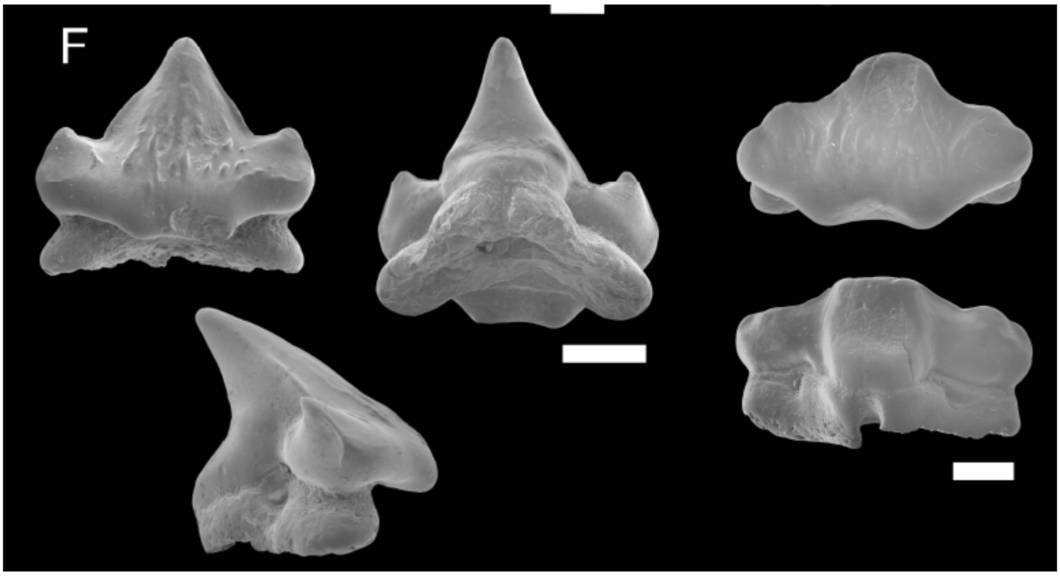
Abstract: The early Miocene is characterized by warm conditions until the middle Miocene when temperatures dropped significantly. The presence of tropical to subtropical invertebrate faunas in early Miocene sediments of Chile supports the hypothesis of warm temperatures. The Neogene fossil record of chondrichthyans (holocephalans, sharks, rays and skates) has been well established for Chile. However, most studies focused on middle Miocene to Pliocene records, whereas early Miocene chondrichthyans have been rather poorly investigated up to now. The aim of this study is to describe early Miocene chondrichthyans from Chile and to discuss their paleobiogeographic and ecological implications. Here, we report seventeen chondrichthyan taxa from the early Miocene of Chile. The fauna includes the first fossil record of *Mustelus* from the Pacific coast of South America, the first oral tooth of *Pristiophorus humboldti* nov. sp. from the Neogene of South America and the first fossil record of *Alopias* from the Neogene of Chile. We are able to increase the total number of taxa from the early Miocene of Chile from 13 to 21. Faunal shifts in the marine waters of Chile between the early Miocene and the present reveal different biogeographical dynamics: three taxa decreased their southern latitudinal range, seven increased their southern latitudinal range, six went globally extinct and one went regionally extinct. The extinction and latitudinal changes observed in chondrichthyans can be best explained by climatic fluctuations during the Neogene and Holocene along the Pacific coast of South America. However, studies to evaluate the effect of ecological traits should be considered in the future.

ENGELBRECHT, A. & MORS, T. & REGUERO, M.A. & KRIWET, J. (2019): Skates and rays (Elasmobranchii, Batomorphii) from the Eocene La Meseta and Submeseta formations, Seymour Island, Antarctica. *Historical Biology, 31 (8): 1028-1044*

New genera: *Marambioraja, Mesetaraja*

New species: *Raja manitaria, Raja amphitrita, Marambioraja leiostemma, Mesetaraja maleficapelli,*

Abstract: Eocene deposits of the famous La Meseta Formation of Seymour Island, Antarctic Peninsula, yielded the most diverse Paleogene fossil elasmobranch association of the Southern Hemisphere. In this assemblage, sharks clearly dominate the fauna, whereas batoids are very rare components. Herein, we describe two new taxa of cold water tolerant skates, *Marambioraja leiostemma* gen. et sp. nov., and *Mesetaraja maleficapelli* gen. et sp. nov., two new species of the genus *Raja*, *Raja amphitrita* sp. nov. and *Raja manitaria* sp. nov., as well as remains of warm water adapted myliobatiforms. It is, however, not possible to unambiguously assign these remains either to Myliobatidae or Rhinopteridae, or to any specific genus. Previously reported remains of *Raja*/*Bathyraja*sp. are assigned to the new described species *Raja manitaria* sp. nov. The biogeographic distribution of extant and extinct rays and skates clearly shows that both groups are more widely distributed today than in the past, and additionally seem to have been more diverse in the Northern than the Southern Hemisphere. The occurrence, albeit rare of isolated teeth of skates (Rajidae) and rays (Myliobatidae) in the La Meseta Formation representes a minimum age constraint for their first appearance in the Southern Ocean.



CASE, G.R. & COOK, T.D. & KIGHTLINGER, T. & BORODIN, P.D. (2019): Middle Campanian Euselachian Diversity of the Southern Region of the Atlantic Coastal Plain of North America. *Vertebrate Anatomy Morphology Palaeontology, 7: 69–82*

New species: *Cantioscyllium clementsi*

Abstract: Herein, a rich selachian assemblage from the middle Campanian Bladen Formation located near Elizabethtown, Bladen County, North Carolina, USA is described. This assemblage consists of 19 species from 18 genera, at least 14 families, and seven orders and introduces the new species *Cantioscyllium clementsi* sp. nov. The recovered six lamniforms and *Squatina*, *Plicatoscyllium*, and *Igdabatis* spp. had large cosmopolitan distributions, whereas the new ginglymostomatid species and remaining 10 hybodontid and batoid taxa were likely endemic to the waters of North America.

MARRAMÀ, G. & CARNEVALE, G. & GIUSBERTI, L. & NAYLOR, G.J.P. & KRIWET, J. (2019): *A bizarre* Eocene dasyatoid batomorph (Elasmobranchii, Myliobatiformes) from the Bolca Lagerstätte (Italy) reveals a new, extinct body plan for stingrays. *Scientific Reports, 9: 14087*

New genus: *Lessiniabatis*

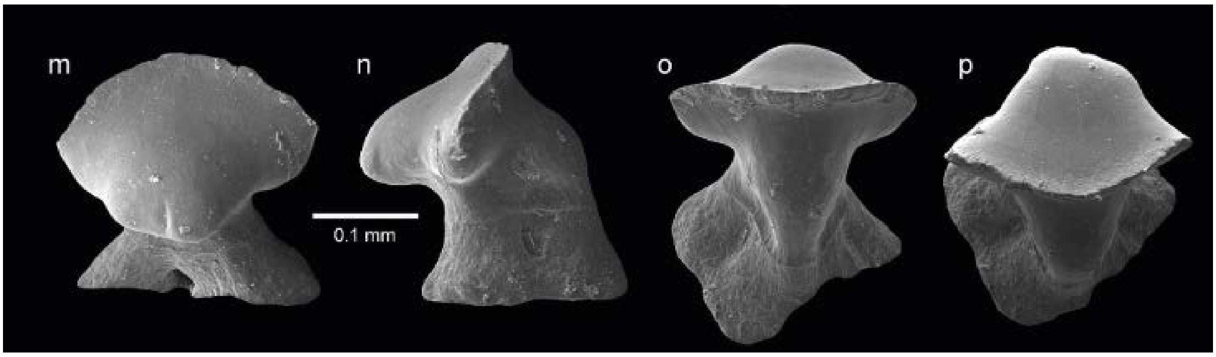
New species: *Lessiniabatis aenigmatica*

Abstract: Lagerstätte (Italy) has provided new insights into the fish biodiversity of the western Tethys. The morphological analysis of three previously undescribed specimens from the Pesciara deposit of Bolca revealed the existence of a new stingray taxon, †*Lessiniabatis aenigmatica* gen. et sp. nov., which is unique among the myliobatiform batoids in having the following unique combination of characters: low number of vertebrae posterior to the pelvic girdle (65–68); thoracolumbar synarcual extending backward beyond the pelvic girdle; tail extremely short not protruding from the posterior edge of the pectoral disc; radials proximally fused to each other; pelvic girdle extremely small and strongly arched; dorsal and caudal fins absent; tail stings and cartilaginous tail rod absent; and teeth of dasyatoid morphology with smooth enameloid surface. The phylogenetic analysis suggests that †*Lessiniabatis* gen. nov. is deeply nested within the benthic stingrays (Dasyatoidea) representing the sister to all dasyatids and potamotrygonids. Its unique anatomy clearly reveals the existence of a new hitherto unknown body plan experimented by benthic stingrays, whose evolution can be possibly linked to the adaptive fish radiation in the aftermath of the end-Cretaceous extinction.

SALAME, I. & ASAN, A. (2019): A new *Odontorhytis* species (Chondrichthyes) from the Middle Eocene of Elgedida Mine, Bahariya Oasis, Egypt. *Egyptian Journal of Geology, 63: 407-415*

New species: *Odontorhytis bahariensis*

Abstract: During a systematic examination of a chondrichthyan assemblage collected from the middle Eocene (probably Lutetian) glauconitic sandstone bed overlying the iron ore of ElGedida mine, in the Bahariya oasis, the authors came across a large number of minute teeth belonging to genus *Odontorhytis*. By comparing these teeth to the already known species *Odontorhytis pappenheimi* from the middle-late Eocene (Bartonian-Priabonian) of Egypt, it appeared that they differ from the latter species by a number of consistent characters, and must be assigned to a new species– *Odontorhytis bahariensis*.

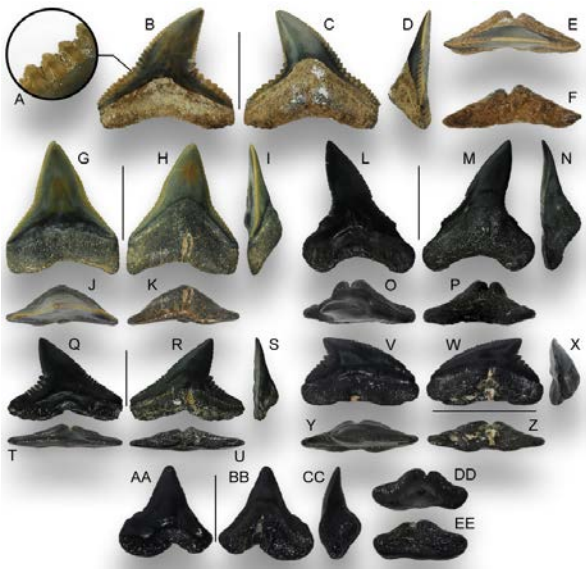


STUMPF, S. & KRIWET, J. (2019): A new Pliensbachian elasmobranch (Vertebrata, Chondrichthyes) assemblage from Europe, and its contribution to the understanding of late Early Jurassic elasmobranch diversity and distributional patterns. *Paläontologische Zeitschrift, 93 (4): 637–658*

New genus: *Antiquaobatis*

New species: *Antiquaobatis grimmenensis*

Abstract: Here we describe a new, previously unrecognized elasmobranch microfossil assemblage consisting of isolated dental material from late Pliensbachian marginal marine, near-shore deposits of Grimmen in north-eastern Germany. The faunal composition indicates close affinities to other European pre-Toarcian elasmobranch-bearing localities, as it is predominantly composed of Hybodontiformes (*Hybodus reticulatus*?, *H*. *hauffianus*?, *Lissodus* sp.), Synechodontiformes (*Palidiplospinax enniskilleni, P*. *occultidens*, *Paraorthacodus* sp., *Sphenodus* sp.), and Hexanchiformes (*Notidanoides* sp.), as well as teeth attributable of the enigmatic Early Jurassic galeomorph shark *Agaleus dorsetensis*. In addition, the here reported elasmobranch tooth assemblage includes the oldest undisputable fossil records of Orectolobiformes and Batomorphii, each being represented by a single complete tooth only. The orectolobiform specimen is reminiscent of hemiscyllids but left in open nomenclature due to its very generalized morphology preventing any taxonomic identification. The batomorph tooth, conversely, is characterized by a unique combination of morphological features, which allows the introduction of new genus and species, *Antiquaobatis grimmenensis* gen. et sp. nov. The fossil assemblage presented here contributes to our current knowledge of late Early Jurassic chondrichthyan diversity and distributional patterns, providing some support for the hypothesis that most modern neoselachian lineages were initially linked to marginal marine, near-shore environments, before moving into open marine, offshore habitats by the Toarcian.

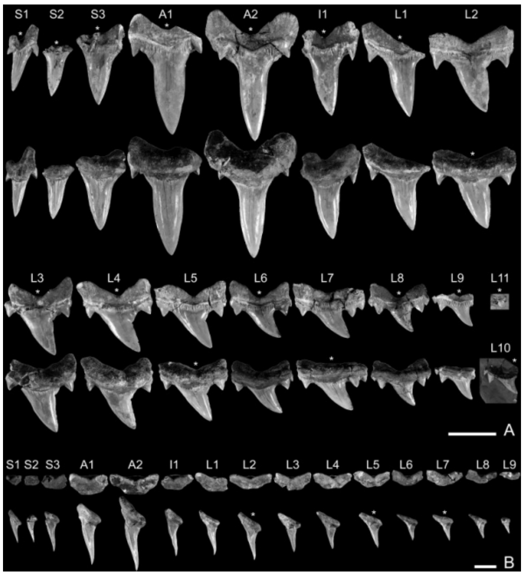


EBERSOLE, J.A. & CICIMURRI, D.J. & STRINGER, G.L. (2019): Taxonomy and biostratigraphy of the elasmobranchs and bony fishes (Chondrichthyes and Osteichthyes) of the lower-to-middle Eocene (Ypresian to Bartonian) Claiborne Group in Alabama, USA, including an analysis of otoliths. *Palaeontology, 1–274*

New genus: *Pseudabdounia*

New species: *Carcharhinus mancinae*

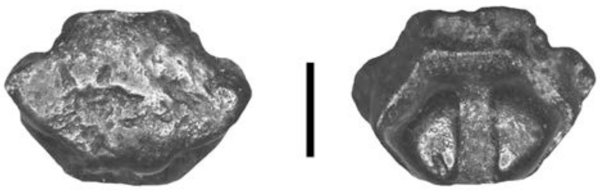
Abstract: The Tallahatta Formation, Lisbon Formation, and Gosport Sand are the three lithostratigraphic units that make up the lower-to-middle Eocene Claiborne Group. In Alabama, these marine units are among the most fossiliferous in the state and a long history of scattered reports have attempted to document their fossil diversity. In this study, we examined 20931 elasmobranch and bony fish elements, including otoliths, derived from Claiborne Group units in Alabama and identified 115 unequivocal taxa. Among the taxa identified, one new species is described, *Carcharhinus mancinae* sp. nov., and *Pseudabdounia* gen. nov. is a new genus erected to include two species formerly placed within *Abdounia* Capatta, 1980. New taxonomic combinations proposed include *Pseudabdounia claibornensis* (White, 1956) gen. et comb. nov., *Pseudabdounia recticona* (Winkler, 1874) gen. et comb. nov., *Physogaleus alabamensis* (Leriche, 1942) comb. nov., and *Eutrichiurides plicidens* (Arambourg, 1952) comb. nov. We also report the first North American paleobiogeographic occurrences of *Aturobatis* aff. *A. aquensis* Adnet, 2006, *Brachycarcharias atlasi* (Arambourg, 1952), *Eutrichiurides plicidens* comb. nov., *Galeorhinus louisi* Adnet & Cappetta, 2008, *Ginglymostoma maroccanum* Noubhani & Cappetta, 1997, *Gymnosarda* sp., *Mennerotodus* sp., *Rhizoprionodon ganntourensis* (Arambourg, 1952), *Stenoscyllium* aff. *S. priemi* Noubhani & Cappetta, 1997, *Trichiurus oshosunensis* White, 1926, and the first North American occurrence for a fossil member of the Balistidae Risso, 1810. Our sample also included 26 taxa that represented first paleobiogeographic occurrences for Alabama, including *Abdounia beaugei* (Arambourg, 1935), *Albula eppsi* White, 1931, *Ariosoma nonsector* Nolf & Stringer, 2003, *Anisotremus*? sp., *Anomotodon* sp., *Brachycarcharias twiggsensis* (Case, 1981), *Burnhamia daviesi* (Woodward, 1889), *Eoplinthicus yazooensis* Capetta & Stringer, 2002, *Galeorhinus ypresiensis* (Casier, 1946), *Gnathophis meridies* (Frizzell & Lamber, 1962), *Haemulon*? *obliquus* (Müller, 1999), *Hypolophodon sylvestris* (White, 1931), *Malacanthus*? *sulcatus* (Koken, 1888), *Meridiania* cf. *M. convexa* Case, 1994, *Palaeocybium proosti* (Storms, 1897), *Paraconger sector* (Koken, 1888), *Paralbula* aff. *P. marylandica* Blake, 1940, *Phyllodus toliapicus* Agassiz, 1844, *Propristis schweinfurthi* Dames, 1883, *Pycnodus* sp., *Pythonichthys colei* (Müller, 1999), *Scomberomorus stormsi* (Leriche, 1905), *Signata stenzeli* Frizzell & Dante, 1965, and *Signata nicoli* Frizzell & Dante, 1965, and the first Paleogene occurrences in Alabama of a member of the Gobiidae Cuvier, 1816. A biostratigraphic analysis of our sample showed stratigraphic range extensions for several taxa, including the first Bartonian occurrences of *Eoplinthicus yazooensis*, *Jacquhermania duponti* (Winkler, 1876), *Meridiania* cf. *M. convexa*, *Phyllodus toliapicus*, and “*Rhinobatos*” *bruxelliensis* (Jaekel, 1894), range extensions into the late Ypresian and Bartonian for *Tethylamna dunni* Cappetta & Case, 2016 and *Scoliodon conecuhensis* Cappetta & Case, 2016, the first late Ypresian records of *Galeorhinus louisi*, the first Lutetian occurrence of *Gymnosarda* Gill, 1862, and a range extension for *Fisherichthys* aff. *F. folmeri* Weems, 1999 into the middle Bartonian. Larger biostratigraphic and evolutionary trends are also documented, such as the acquisition of serrations in *Otodus* spp., possible population increases for the Rhinopterinae Jordan & Evermann, 1896 and Carcharhiniformes Compagno, 1973 in the Bartonian, and the apparent diversification of the Tetraodontiformes Berg, 1940 during the same stage. This study helps better our understanding of early-to-middle Eocene elasmobranch and bony fish diversity, paleobiogeography, and biostratigraphy in the Gulf Coastal Plain of North America.

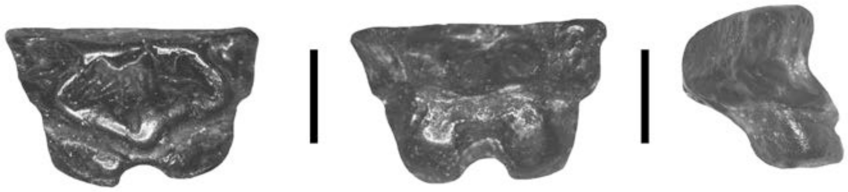


SHIMADA, K. & EVERHART, M.J. (2019): A new large Late Cretaceous lamniform shark from North America, with comments on the taxonomy, paleoecology, and evolution of the genus *Cretodus*. *Journal of Vertebrate Paleontology, in press*

New species: *Cretodus houghtonorum*

Abstract: We describe a partial skeleton of the Late Cretaceous shark, *Cretodus*, collected from the Blue Hill Shale (middle Turonian) in north-central Kansas, U.S.A. It consists of 134 disarticulated teeth, 61 vertebrae, 23 placoid scales, and fragments of calcified cartilage. The scale morphology suggests that *Cretodus* was a rather sluggish shark, and the vertebral morphology affirms its placement into Lamniformes. With a strong tendency towards monognathic heterodonty, the dental morphology indicates that the specimen belongs to a new species, *C. houghtonorum*, sp. nov., increasing the total known species of *Cretodus* to five. The five species can be divided into three distinct groups: the *longiplicatus*/*semiplicatus*-grade, *gigantea/houghtonorum*-grade, and *crassidens*-grade. *Cretodus*, that successively evolved by broadening the tooth crown. The individual of *C. houghtonorum*, sp. nov., is estimated to be about 515 cm in total length (TL). Our vertebra-based growth analysis suggests that the shark was about 118 cm TL at birth and that the species had an estimated maximum growth length of 684 cm TL. The large size at birth indicates that the intrauterine cannibalism behavior of embryos seen in extant lamniforms had already evolved by the Late Cretaceous. Where *C. houghtonorum*, sp. nov., preferred nearshore environments, the specimen co-occurred with isolated teeth of *Squalicorax* and fragments of two dorsal fin spines of a hybodont shark, circumstantially indicating that the individual of *Cretodus* fed on the much smaller hybodont and was scavenged by *Squalicorax*.





MAISCH, H.M. (2019): A new species of *Hypolophites* (Chondrichthyes, Myliobatiformes) from the Lower Clayton Limestone Unit of the Midway Group (Paleocene), near Malvern, Arkansas, USA. *Journal of Paleontology, in press*

New species: *Hypolophites beckeri*

Abstract: A new species of *Hypolophites* (Chondrichthyes, Myliobatiformes) is described from an assemblage of isolated pavement teeth recovered from the Lower Clayton Limestone Unit of the Midway Group (Paleocene) near Malvern, Arkansas. These teeth were collected from several localized lag deposits containing an abundance of chondrichthyan and osteichthyan teeth, invertebrate remains, and trace fossils indicative of a marginal-shallow marine depositional environment. To date, only four additional species of *Hypolophites* have been reported from Paleocene deposits that occur along the west coast of central-northern Africa and in central New Jersey, USA. The identification of *Hypolophites beckeri* n. sp. in southwestern Arkansas extends the distribution of this biostratigraphically significant genus ~1,750 km westward into the Mississippi Embayment and Gulf Coastal Plain of the USA. The distribution of *Hypolophites* species during the Paleocene attests to the uniformity of shallow marine shelves between western Africa and the Atlantic and Gulf Coastal Plains of the USA, as well as myliobatiform diversification following the K/Pg mass extinction event.

FREY, L. & COATES, M. & GINTER, M. & HAIRAPETIAN, V. & RÜCKLIN, M. & JERJEN, I. & KLUG, C. (2019): The early elasmobranch *Phoebodus*: phylogenetic relationships, ecomorphology and a new time-scale for shark evolution. *Proceedings of the Royal Society B: Biological Sciences, 286 (1912): 20191336*

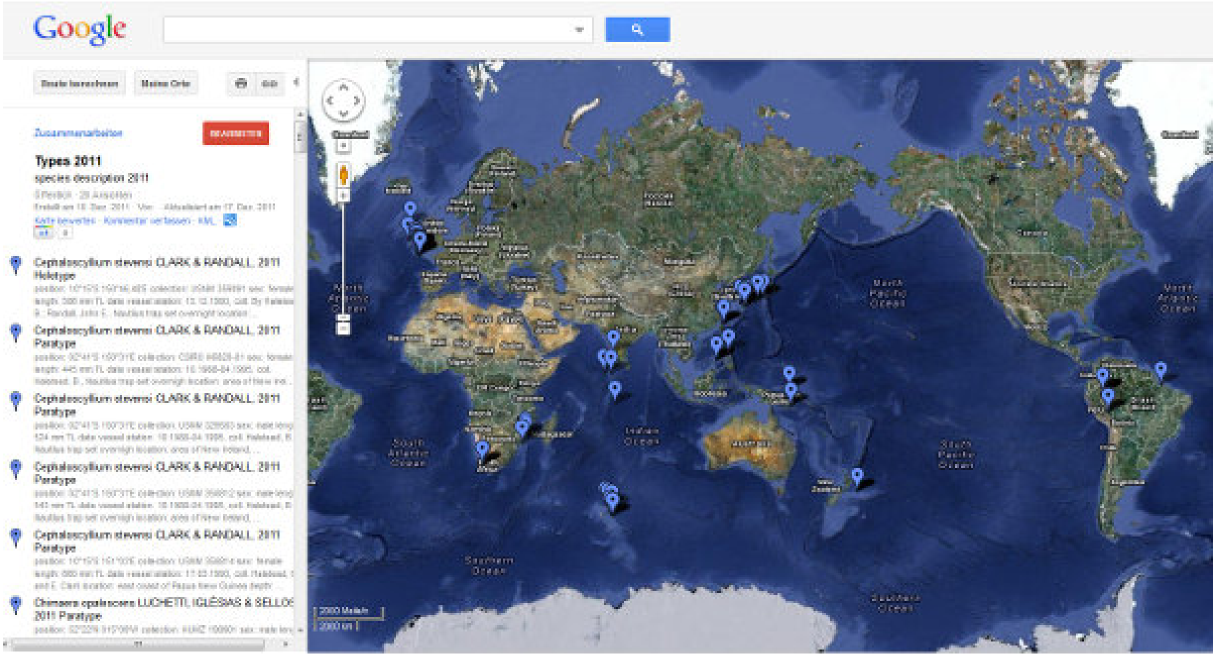
New species: *Phoebodus saidselachus*

Abstract: Anatomical knowledge of early chondrichthyans and estimates of their phylogeny are improving, but many taxa are still known only from microremains. The nearly cosmopolitan and regionally abundant Devonian genus *Phoebodus* has long been known solely from isolated teeth and fin spines. Here, we report the first skeletal remains of *Phoebodus* from the Famennian (Late Devonian) of the Maïder region of Morocco, revealing an anguilliform body, specialized braincase, hyoid arch, elongate jaws and rostrum, complementing its characteristic dentition and ctenacanth fin spines preceding both dorsal fins. Several of these features corroborate a likely close relationship with the Carboniferous species *Thrinacodus gracia*, and phylogenetic analysis places both taxa securely as members of the elasmobranch stem lineage. Identified as such, phoebodont teeth provide a plausible marker for range extension of the elasmobranchs into the Middle Devonian, thus providing a new minimum date for the origin of the chondrichthyan crown-group. Among pre-Carboniferous jawed vertebrates, the anguilliform body shape of *Phoebodus* is unprecedented, and its specialized anatomy is, in several respects, most easily compared with the modern frilled

shark *Chlamydoselachus*. These results add greatly to the morphological, and by implication ecological, disparity of the earliest elasmobranchs.

3.3 Descriptions of extant genera/species

Types in Google map
(http://maps.google.com/maps/ms?msa=0&msid=217824177182325311271.0004b3bc714004039f92e&hl=de&ie=UTF8&ll=3.123195,53.281417&spn=106.420277,253.202833&t=h&vpsrc=6&source=embed)



3.3.1 List of new extant genera

[*Akheilos*]()	WHITE, FAHMI & WEIGMANN, 2019	(Carcharhiniformes: Scyliorhinidae)

3.3.2 List of new extant species

Akheilos suwartanai	WHITE, FAHMI & WEIGMANN, 2019	(Carcharhiniformes: Scyliorhinidae)
Carcharhinus obsoletus	WHITE, KYNE & HARRIS, 2019	(Carcharhiniformes: Carcharhinidae)
Dipturus lamillai	CONCHA, CAIRA, EBERT & POMPERT, 2019	(Rajiformes: Rajidae)
Leucoraja elaineae	EBERT & LESLIE, 2019	(Rajiformes: Rajidae)
Mollisquama mississippiensis	GRACE, DOOSEY, DENTON, NAYLOR, BART & MAISEY, 2019	(Squaliformes: Dalatiidae)
Parmaturus angelae	SOARES, DE CARVALHO, SCHWINGEL & GADIG, 2019	(Carcharhiniformes: Pentanchidae)
Potamotrygon marquesi	DA SILVA & LOBODA, 2019	(Myliobatiformes: Potamotrygonidae)

Pseudobatos buthi	RUTLEDGE, 2019	(Rhinopristiformes: Rhinobatidae)
Rhinobatos ranongensis	LAST, SÉRET & NAYLOR, 2019	(Rhinopristiformes: Rhinobatidae)
Squalus boretzi	DOLGANOV, 2019	(Squaliformes: Squalidae)

3.3.3 Biodiversity

In this newly added chapter of this year's POTY, we are giving an overview of all taxonomically valid chondrichthyan species sorted by the three higher level groups chimaeriforms, selachians and batoids. Based on this data, we present tables providing information on the 20 most researched species of each group and the number of scientific publications on family and order level. Note that the number of publications also includes synonyms and misspellings, information not accessible by regular search operations. If you need individual analysis of data from our database please contact Nico Straube or Jürgen Pollerspöck (juergen.pollerspoeck@shark-references.com or nicolas.straube@shark-references.com).

3.3.3.1 Complete list of taxonomically valid shark species

Genus	Species	Author	Family	Order	No of records
Carcharhinus	*acronotus*	(POEY, 1860)	Carcharhinidae	Carcharhiniformes	234
Carcharhinus	*albimarginatus*	(RÜPPELL, 1837)	Carcharhinidae	Carcharhiniformes	264
Carcharhinus	*altimus*	(SPRINGER, 1950)	Carcharhinidae	Carcharhiniformes	220
Carcharhinus	*amblyrhynchoides*	(WHITLEY, 1934)	Carcharhinidae	Carcharhiniformes	117
Carcharhinus	*amblyrhynchos*	(BLEEKER, 1856)	Carcharhinidae	Carcharhiniformes	380
Carcharhinus	*amboinensis*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	202
Carcharhinus	*borneensis*	(BLEEKER, 1858)	Carcharhinidae	Carcharhiniformes	29
Carcharhinus	*brachyurus*	(GÜNTHER, 1870)	Carcharhinidae	Carcharhiniformes	361
Carcharhinus	*brevipinna*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	436
Carcharhinus	*cautus*	(WHITLEY, 1945)	Carcharhinidae	Carcharhiniformes	65
Carcharhinus	*coatesi*	(WHITLEY, 1939)	Carcharhinidae	Carcharhiniformes	20
Carcharhinus	*dussumieri*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	156
Carcharhinus	*falciformis*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	726
Carcharhinus	*fitzroyensis*	(WHITLEY, 1943)	Carcharhinidae	Carcharhiniformes	59
Carcharhinus	*galapagensis*	(SNODGRASS & HELLER, 1905)	Carcharhinidae	Carcharhiniformes	217
Carcharhinus	*hemiodon*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	61
Carcharhinus	*humani*	WHITE & WEIGMANN, 2014	Carcharhinidae	Carcharhiniformes	10
Carcharhinus	*isodon*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	138
Carcharhinus	*leiodon*	GARRICK, 1985	Carcharhinidae	Carcharhiniformes	34
Carcharhinus	*leucas*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	896
Carcharhinus	*limbatus*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	875
Carcharhinus	*longimanus*	(POEY, 1861)	Carcharhinidae	Carcharhiniformes	444
Carcharhinus	*macloti*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	160
Carcharhinus	*melanopterus*	(QUOY & GAIMARD, 1824)	Carcharhinidae	Carcharhiniformes	491

Carcharhinus	*obscurus*	(LESUEUR, 1818)	Carcharhinidae	Carcharhiniformes	645
Carcharhinus	*obsoletus*	WHITE, KYNE & HARRIS, 2019	Carcharhinidae	Carcharhiniformes	5
Carcharhinus	*perezii*	(POEY, 1876)	Carcharhinidae	Carcharhiniformes	183
Carcharhinus	*plumbeus*	(NARDO, 1827)	Carcharhinidae	Carcharhiniformes	851
Carcharhinus	*porosus*	(RANZANI, 1839)	Carcharhinidae	Carcharhiniformes	185
Carcharhinus	*sealei*	(PIETSCHMANN, 1913)	Carcharhinidae	Carcharhiniformes	81
Carcharhinus	*signatus*	(POEY, 1868)	Carcharhinidae	Carcharhiniformes	164
Carcharhinus	*sorrah*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	300
Carcharhinus	*tilstoni*	(WHITLEY, 1950)	Carcharhinidae	Carcharhiniformes	99
Carcharhinus	*tjutjot*	(BLEEKER, 1852)	Carcharhinidae	Carcharhiniformes	22
Galeocerdo	*cuvier*	(PÉRON & LESUEUR, 1822)	Carcharhinidae	Carcharhiniformes	1090
Glyphis	*gangeticus*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	96
Glyphis	*garricki*	COMPAGNO, WHITE & LAST, 2008	Carcharhinidae	Carcharhiniformes	38
Glyphis	*glyphis*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	59
Isogomphodon	*oxyrhynchus*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	55
Lamiopsis	*temminckii*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	64
Lamiopsis	*tephrodes*	(FOWLER, 1905)	Carcharhinidae	Carcharhiniformes	13
Loxodon	*macrorhinus*	MÜLLER & HENLE, 1839	Carcharhinidae	Carcharhiniformes	168
Nasolamia	*velox*	(GILBERT, 1898)	Carcharhinidae	Carcharhiniformes	60
Negaprion	*acutidens*	(RÜPPELL, 1837)	Carcharhinidae	Carcharhiniformes	248
Negaprion	*brevirostris*	(POEY, 1868)	Carcharhinidae	Carcharhiniformes	611
Prionace	*glauca*	(LINNAEUS, 1758)	Carcharhinidae	Carcharhiniformes	1379
Rhizoprionodon	*acutus*	(RÜPPELL, 1837)	Carcharhinidae	Carcharhiniformes	393
Rhizoprionodon	*lalandii*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	133
Rhizoprionodon	*longurio*	(JORDAN & GILBERT, 1882)	Carcharhinidae	Carcharhiniformes	100
Rhizoprionodon	*oligolinx*	SPRINGER, 1964	Carcharhinidae	Carcharhiniformes	86

Rhizoprionodon	*porosus*	(POEY, 1861)	Carcharhinidae	Carcharhiniformes	145
Rhizoprionodon	*taylori*	(OGILBY, 1915)	Carcharhinidae	Carcharhiniformes	95
Rhizoprionodon	*terraenovae*	(RICHARDSON, 1836)	Carcharhinidae	Carcharhiniformes	328
Scoliodon	*laticaudus*	MÜLLER & HENLE, 1838	Carcharhinidae	Carcharhiniformes	211
Scoliodon	*macrorhynchos*	(BLEEKER, 1852)	Carcharhinidae	Carcharhiniformes	21
Triaenodon	*obesus*	(RÜPPELL, 1837)	Carcharhinidae	Carcharhiniformes	363
Chaenogaleus	*macrostoma*	(BLEEKER, 1852)	Hemigaleidae	Carcharhiniformes	93
Hemigaleus	*australiensis*	WHITE, LAST & COMPAGNO, 2005	Hemigaleidae	Carcharhiniformes	38
Hemigaleus	*microstoma*	BLEEKER, 1852	Hemigaleidae	Carcharhiniformes	99
Hemipristis	*elongata*	(KLUNZINGER, 1871)	Hemigaleidae	Carcharhiniformes	173
Paragaleus	*leucolomatus*	COMPAGNO & SMALE, 1985	Hemigaleidae	Carcharhiniformes	14
Paragaleus	*longicaudatus*	(BESSEDNOV, 1966)	Hemigaleidae	Carcharhiniformes	41
Paragaleus	*pectoralis*	(GARMAN, 1906)	Hemigaleidae	Carcharhiniformes	46
Paragaleus	*tengi*	(CHEN, 1963)	Hemigaleidae	Carcharhiniformes	27
Leptocharias	*smithii*	(MÜLLER & HENLE, 1839)	Leptochariidae	Carcharhiniformes	46
Apristurus	*albisoma*	NAKAYA & SÉRET, 1999	Pentanchidae	Carcharhiniformes	15
Apristurus	*ampliceps*	SASAHARA, SATO & NAKAYA, 2008	Pentanchidae	Carcharhiniformes	12
Apristurus	*aphyodes*	NAKAYA & STEHMANN, 1998	Pentanchidae	Carcharhiniformes	26
Apristurus	*australis*	SATO, NAKAYA & YOROZU, 2008	Pentanchidae	Carcharhiniformes	12
Apristurus	*breviventralis*	KAWAUCHI, WEIGMANN & NAKAYA, 2014	Pentanchidae	Carcharhiniformes	5
Apristurus	*brunneus*	(GILBERT, 1892)	Pentanchidae	Carcharhiniformes	73
Apristurus	*bucephalus*	WHITE, LAST & POGONOSKI, 2008	Pentanchidae	Carcharhiniformes	5
Apristurus	*canutus*	SPRINGER & HEEMSTRA, 1979	Pentanchidae	Carcharhiniformes	24
Apristurus	*exsanguis*	SATO, NAKAYA & STEWART, 1999	Pentanchidae	Carcharhiniformes	15
Apristurus	*fedorovi*	DOLGANOV, 1983	Pentanchidae	Carcharhiniformes	20
Apristurus	*garricki*	SATO, STEWART & NAKAYA, 2013	Pentanchidae	Carcharhiniformes	6

Apristurus	*gibbosus*	MENG, CHU & LI, 1985	Pentanchidae	Carcharhiniformes	11
Apristurus	*herklotsi*	(FOWLER, 1934)	Pentanchidae	Carcharhiniformes	35
Apristurus	*indicus*	(BRAUER, 1906)	Pentanchidae	Carcharhiniformes	36
Apristurus	*internatus*	DENG, XIONG & ZHAN, 1988	Pentanchidae	Carcharhiniformes	7
Apristurus	*investigatoris*	(MISRA, 1962)	Pentanchidae	Carcharhiniformes	17
Apristurus	*japonicus*	NAKAYA, 1975	Pentanchidae	Carcharhiniformes	24
Apristurus	*kampae*	TAYLOR, 1972	Pentanchidae	Carcharhiniformes	38
Apristurus	*laurussonii*	(SAEMUNDSSON, 1922)	Pentanchidae	Carcharhiniformes	85
Apristurus	*longicephalus*	NAKAYA, 1975	Pentanchidae	Carcharhiniformes	35
Apristurus	*macrorhynchus*	(TANAKA, 1909)	Pentanchidae	Carcharhiniformes	35
Apristurus	*macrostomus*	CHU, MENG & LI, 1985	Pentanchidae	Carcharhiniformes	15
Apristurus	*manis*	(SPRINGER, 1979)	Pentanchidae	Carcharhiniformes	40
Apristurus	*melanoasper*	IGLÉSIAS, NAKAYA & STEHMANN, 2004	Pentanchidae	Carcharhiniformes	35
Apristurus	*microps*	(GILCHRIST, 1922)	Pentanchidae	Carcharhiniformes	44
Apristurus	*micropterygeus*	MENG, CHU & LI, 1986	Pentanchidae	Carcharhiniformes	10
Apristurus	*nakayai*	IGLÉSIAS, 2012	Pentanchidae	Carcharhiniformes	6
Apristurus	*nasutus*	DE BUEN, 1959	Pentanchidae	Carcharhiniformes	36
Apristurus	*parvipinnis*	SPRINGER & HEEMSTRA, 1979	Pentanchidae	Carcharhiniformes	36
Apristurus	*pinguis*	DENG, XIONG & ZHAN, 1983	Pentanchidae	Carcharhiniformes	18
Apristurus	*platyrhynchus*	(TANAKA, 1909)	Pentanchidae	Carcharhiniformes	55
Apristurus	*profundorum*	(GOODE & BEAN, 1896)	Pentanchidae	Carcharhiniformes	52
Apristurus	*riveri*	BIGELOW & SCHROEDER, 1944	Pentanchidae	Carcharhiniformes	30
Apristurus	*saldanha*	(BARNARD, 1925)	Pentanchidae	Carcharhiniformes	30
Apristurus	*sibogae*	(WEBER, 1913)	Pentanchidae	Carcharhiniformes	17
Apristurus	*sinensis*	CHU & HU, 1981	Pentanchidae	Carcharhiniformes	24
Apristurus	*spongiceps*	(GILBERT, 1905)	Pentanchidae	Carcharhiniformes	20

Apristurus	*stenseni*	(SPRINGER, 1979)	Pentanchidae	Carcharhiniformes	9
Apristurus	*yangi*	WHITE, MANA & NAYLOR, 2017	Pentanchidae	Carcharhiniformes	5
Asymbolus	*analis*	(OGILBY, 1885)	Pentanchidae	Carcharhiniformes	41
Asymbolus	*funebris*	COMPAGNO, STEVENS & LAST, 1999	Pentanchidae	Carcharhiniformes	7
Asymbolus	*galacticus*	SÉRET & LAST, 2008	Pentanchidae	Carcharhiniformes	5
Asymbolus	*occiduus*	LAST, GOMON & GLEDHILL, 1999	Pentanchidae	Carcharhiniformes	7
Asymbolus	*pallidus*	LAST, GOMON & GLEDHILL, 1999	Pentanchidae	Carcharhiniformes	13
Asymbolus	*parvus*	COMPAGNO, STEVENS & LAST, 1999	Pentanchidae	Carcharhiniformes	12
Asymbolus	*rubiginosus*	LAST, GOMON & GLEDHILL, 1999	Pentanchidae	Carcharhiniformes	22
Asymbolus	*submaculatus*	COMPAGNO, STEVENS & LAST, 1999	Pentanchidae	Carcharhiniformes	7
Asymbolus	*vincenti*	(ZIETZ, 1908)	Pentanchidae	Carcharhiniformes	31
Bythaelurus	*alcockii*	(GARMAN, 1913)	Pentanchidae	Carcharhiniformes	15
Bythaelurus	*bachi*	WEIGMANN, EBERT, CLERKIN, STEHMANN & NAYLOR, 2016	Pentanchidae	Carcharhiniformes	3
Bythaelurus	*canescens*	(GÜNTHER, 1878)	Pentanchidae	Carcharhiniformes	41
Bythaelurus	*clevai*	(SÉRET, 1987)	Pentanchidae	Carcharhiniformes	11
Bythaelurus	*dawsoni*	(SPRINGER, 1971)	Pentanchidae	Carcharhiniformes	27
Bythaelurus	*giddingsi*	McCOSKER, LONG & BALDWIN, 2012	Pentanchidae	Carcharhiniformes	8
Bythaelurus	*hispidus*	(ALCOCK, 1891)	Pentanchidae	Carcharhiniformes	51
Bythaelurus	*immaculatus*	(CHU & MENG, 1982)	Pentanchidae	Carcharhiniformes	15
Bythaelurus	*incanus*	LAST & STEVENS, 2008	Pentanchidae	Carcharhiniformes	7
Bythaelurus	*lutarius*	(SPRINGER & D'AUBREY, 1972)	Pentanchidae	Carcharhiniformes	29
Bythaelurus	*naylori*	EBERT & CLERKIN, 2015	Pentanchidae	Carcharhiniformes	5
Bythaelurus	*stewarti*	WEIGMANN, KASCHNER & THIEL, 2018	Pentanchidae	Carcharhiniformes	1
Bythaelurus	*tenuicephalus*	KASCHNER, WEIGMANN & THIEL, 2015	Pentanchidae	Carcharhiniformes	6

Bythaelurus	*vivaldii*	WEIGMANN & KASCHNER, 2017	Pentanchidae	Carcharhiniformes	3
Cephalurus	*cephalus*	(GILBERT, 1892)	Pentanchidae	Carcharhiniformes	51
Figaro	*boardmani*	(WHITLEY, 1928)	Pentanchidae	Carcharhiniformes	50
Figaro	*striatus*	GLEDHILL, LAST & WHITE, 2008	Pentanchidae	Carcharhiniformes	7
Galeus	*antillensis*	SPRINGER, 1979	Pentanchidae	Carcharhiniformes	17
Galeus	*arae*	(NICHOLS, 1927)	Pentanchidae	Carcharhiniformes	35
Galeus	*atlanticus*	(VAILLANT, 1888)	Pentanchidae	Carcharhiniformes	53
Galeus	*cadenati*	SPRINGER, 1966	Pentanchidae	Carcharhiniformes	24
Galeus	*corriganae*	WHITE, MANA & NAYLOR, 2016	Pentanchidae	Carcharhiniformes	4
Galeus	*eastmani*	(JORDAN & SNYDER, 1904)	Pentanchidae	Carcharhiniformes	44
Galeus	*gracilis*	COMPAGNO & STEVENS, 1993	Pentanchidae	Carcharhiniformes	16
Galeus	*longirostris*	TACHIKAWA & TANIUCHI, 1987	Pentanchidae	Carcharhiniformes	11
Galeus	*melastomus*	RAFINESQUE, 1810	Pentanchidae	Carcharhiniformes	373
Galeus	*mincaronei*	SOTO, 2001	Pentanchidae	Carcharhiniformes	13
Galeus	*murinus*	(COLLETT, 1904)	Pentanchidae	Carcharhiniformes	41
Galeus	*nipponensis*	NAKAYA, 1975	Pentanchidae	Carcharhiniformes	29
Galeus	*piperatus*	SPRINGER & WAGNER, 1966	Pentanchidae	Carcharhiniformes	27
Galeus	*polli*	CADENAT, 1959	Pentanchidae	Carcharhiniformes	44
Galeus	*priapus*	SÉRET & LAST, 2008	Pentanchidae	Carcharhiniformes	7
Galeus	*sauteri*	(JORDAN & RICHARDSON, 1909)	Pentanchidae	Carcharhiniformes	32
Galeus	*schultzi*	SPRINGER, 1979	Pentanchidae	Carcharhiniformes	14
Galeus	*springeri*	KONSTANTINOU & COZZI, 1998	Pentanchidae	Carcharhiniformes	14
Halaelurus	*boesemani*	SPRINGER & D'AUBREY, 1972	Pentanchidae	Carcharhiniformes	26
Halaelurus	*buergeri*	(MÜLLER & HENLE, 1838)	Pentanchidae	Carcharhiniformes	57
Halaelurus	*lineatus*	BASS, D'AUBREY & KISTNASAMY, 1975	Pentanchidae	Carcharhiniformes	23
Halaelurus	*maculosus*	WHITE, LAST & STEVENS, 2007	Pentanchidae	Carcharhiniformes	5

Halaelurus	*natalensis*	(REGAN, 1904)	Pentanchidae	Carcharhiniformes	42
Halaelurus	*quagga*	(ALCOCK, 1899)	Pentanchidae	Carcharhiniformes	30
Halaelurus	*sellus*	WHITE, LAST & STEVENS, 2007	Pentanchidae	Carcharhiniformes	7
Haploblepharus	*edwardsii*	(SCHINZ, 1822)	Pentanchidae	Carcharhiniformes	70
Haploblepharus	*fuscus*	SMITH, 1950	Pentanchidae	Carcharhiniformes	34
Haploblepharus	*kistnasamyi*	HUMAN & COMPAGNO, 2006	Pentanchidae	Carcharhiniformes	9
Haploblepharus	*pictus*	(MÜLLER & HENLE, 1838)	Pentanchidae	Carcharhiniformes	35
Holohalaelurus	*favus*	HUMAN, 2006	Pentanchidae	Carcharhiniformes	10
Holohalaelurus	*grennian*	HUMAN, 2006	Pentanchidae	Carcharhiniformes	8
Holohalaelurus	*melanostigma*	(NORMAN, 1939)	Pentanchidae	Carcharhiniformes	9
Holohalaelurus	*punctatus*	(GILCHRIST, 1914)	Pentanchidae	Carcharhiniformes	38
Holohalaelurus	*regani*	(GILCHRIST, 1922)	Pentanchidae	Carcharhiniformes	50
Parmaturus	*albimarginatus*	SÉRET & LAST, 2007	Pentanchidae	Carcharhiniformes	4
Parmaturus	*albipenis*	SÉRET & LAST, 2007	Pentanchidae	Carcharhiniformes	5
Parmaturus	*angelae*	SOARES, DE CARVALHO, SCHWINGEL & GADIG, 2019	Pentanchidae	Carcharhiniformes	1
Parmaturus	*bigus*	SÉRET & LAST, 2007	Pentanchidae	Carcharhiniformes	8
Parmaturus	*campechiensis*	SPRINGER, 1979	Pentanchidae	Carcharhiniformes	18
Parmaturus	*lanatus*	SÉRET & LAST, 2007	Pentanchidae	Carcharhiniformes	7
Parmaturus	*macmillani*	HARDY, 1985	Pentanchidae	Carcharhiniformes	15
Parmaturus	*melanobranchus*	(CHAN, 1966)	Pentanchidae	Carcharhiniformes	21
Parmaturus	*nigripalatum*	FAHMI & EBERT, 2018	Pentanchidae	Carcharhiniformes	2
Parmaturus	*pilosus*	GARMAN, 1906	Pentanchidae	Carcharhiniformes	29
Parmaturus	*xaniurus*	(GILBERT, 1892)	Pentanchidae	Carcharhiniformes	66
Pentanchus	*profundicolus*	SMITH & RADCLIFFE, 1912	Pentanchidae	Carcharhiniformes	21
Ctenacis	*fehlmanni*	(SPRINGER, 1968)	Proscylliidae	Carcharhiniformes	25
Eridacnis	*barbouri*	(BIGELOW & SCHROEDER,	Proscylliidae	Carcharhiniformes	18

		1944)			
Eridacnis	*radcliffei*	SMITH, 1913	Proscylliidae	Carcharhiniformes	64
Eridacnis	*sinuans*	(SMITH, 1957)	Proscylliidae	Carcharhiniformes	22
Proscyllium	*habereri*	HILGENDORF, 1904	Proscylliidae	Carcharhiniformes	66
Proscyllium	*magnificum*	LAST & VONGPANICH, 2004	Proscylliidae	Carcharhiniformes	11
Gollum	*attenuatus*	(GARRICK, 1954)	Pseudotriakidae	Carcharhiniformes	38
Gollum	*suluensis*	LAST & GAUDIANO, 2011	Pseudotriakidae	Carcharhiniformes	4
Planonasus	*indicus*	EBERT, AKHILESH & WEIGMANN, 2018	Pseudotriakidae	Carcharhiniformes	2
Planonasus	*parini*	WEIGMANN, STEHMANN & THIEL, 2013	Pseudotriakidae	Carcharhiniformes	11
Pseudotriakis	*microdon*	DE BRITO CAPELLO, 1868	Pseudotriakidae	Carcharhiniformes	144
Akheilos	*suwartanai*	WHITE, FAHMI & WEIGMANN, 2019	Scyliorhinidae	Carcharhiniformes	1
Atelomycterus	*baliensis*	WHITE, LAST & DHARMADI, 2005	Scyliorhinidae	Carcharhiniformes	10
Atelomycterus	*erdmanni*	FAHMI & WHITE, 2015	Scyliorhinidae	Carcharhiniformes	3
Atelomycterus	*fasciatus*	COMPAGNO & STEVENS, 1993	Scyliorhinidae	Carcharhiniformes	18
Atelomycterus	*macleayi*	WHITLEY, 1939	Scyliorhinidae	Carcharhiniformes	23
Atelomycterus	*marmoratus*	(BENNETT, 1830)	Scyliorhinidae	Carcharhiniformes	121
Atelomycterus	*marnkalha*	JACOBSEN & BENNETT, 2007	Scyliorhinidae	Carcharhiniformes	14
Aulohalaelurus	*kanakorum*	SÉRET, 1990	Scyliorhinidae	Carcharhiniformes	12
Aulohalaelurus	*labiosus*	(WAITE, 1905)	Scyliorhinidae	Carcharhiniformes	30
Cephaloscyllium	*albipinnum*	LAST, MOTOMURA & WHITE, 2008	Scyliorhinidae	Carcharhiniformes	11
Cephaloscyllium	*cooki*	LAST, SÉRET & WHITE, 2008	Scyliorhinidae	Carcharhiniformes	7
Cephaloscyllium	*fasciatum*	CHAN, 1966	Scyliorhinidae	Carcharhiniformes	33
Cephaloscyllium	*formosanum*	TENG, 1962	Scyliorhinidae	Carcharhiniformes	5
Cephaloscyllium	*hiscosellum*	WHITE & EBERT, 2008	Scyliorhinidae	Carcharhiniformes	11
Cephaloscyllium	*isabellum*	(BONNATERRE, 1788)	Scyliorhinidae	Carcharhiniformes	63

Cephaloscyllium	*laticeps*	(DUMÉRIL, 1853)	Scyliorhinidae	Carcharhiniformes	64
Cephaloscyllium	*pictum*	LAST, SÉRET & WHITE, 2008	Scyliorhinidae	Carcharhiniformes	6
Cephaloscyllium	*sarawakensis*	YANO, AHMED, GAMBANG, HAMAD IDRIS, SOLAHUDDIN & AZNAN, 2005	Scyliorhinidae	Carcharhiniformes	15
Cephaloscyllium	*signourum*	LAST, SÉRET & WHITE, 2008	Scyliorhinidae	Carcharhiniformes	6
Cephaloscyllium	*silasi*	(TALWAR, 1974)	Scyliorhinidae	Carcharhiniformes	28
Cephaloscyllium	*speccum*	LAST, SÉRET & WHITE, 2008	Scyliorhinidae	Carcharhiniformes	11
Cephaloscyllium	*stevensi*	CLARK & RANDALL, 2011	Scyliorhinidae	Carcharhiniformes	6
Cephaloscyllium	*sufflans*	(REGAN, 1921)	Scyliorhinidae	Carcharhiniformes	38
Cephaloscyllium	*umbratile*	JORDAN & FOWLER, 1903	Scyliorhinidae	Carcharhiniformes	65
Cephaloscyllium	*variegatum*	LAST & WHITE, 2008	Scyliorhinidae	Carcharhiniformes	16
Cephaloscyllium	*ventriosum*	(GARMAN, 1880)	Scyliorhinidae	Carcharhiniformes	103
Cephaloscyllium	*zebrum*	LAST & WHITE, 2008	Scyliorhinidae	Carcharhiniformes	7
Poroderma	*africanum*	(GMELIN, 1789)	Scyliorhinidae	Carcharhiniformes	80
Poroderma	*pantherinum*	(MÜLLER & HENLE, 1838)	Scyliorhinidae	Carcharhiniformes	80
Schroederichthys	*bivius*	(MÜLLER & HENLE, 1838)	Scyliorhinidae	Carcharhiniformes	72
Schroederichthys	*chilensis*	(GUICHENOT, 1848)	Scyliorhinidae	Carcharhiniformes	54
Schroederichthys	*maculatus*	SPRINGER, 1966	Scyliorhinidae	Carcharhiniformes	29
Schroederichthys	*saurisqualus*	SOTO, 2001	Scyliorhinidae	Carcharhiniformes	14
Schroederichthys	*tenuis*	SPRINGER, 1966	Scyliorhinidae	Carcharhiniformes	23
Scyliorhinus	*boa*	GOODE & BEAN, 1896	Scyliorhinidae	Carcharhiniformes	40
Scyliorhinus	*cabofriensis*	SOARES, GOMES & DE CARVALHO, 2016	Scyliorhinidae	Carcharhiniformes	6
Scyliorhinus	*canicula*	(LINNAEUS, 1758)	Scyliorhinidae	Carcharhiniformes	1212
Scyliorhinus	*capensis*	(MÜLLER & HENLE, 1838)	Scyliorhinidae	Carcharhiniformes	66
Scyliorhinus	*cervigoni*	MAURIN & BONNET, 1970	Scyliorhinidae	Carcharhiniformes	21
Scyliorhinus	*comoroensis*	COMPAGNO, 1988	Scyliorhinidae	Carcharhiniformes	10

Scyliorhinus	*duhamelii*	(GARMAN, 1913)	Scyliorhinidae	Carcharhiniformes	3
Scyliorhinus	*garmani*	(FOWLER, 1934)	Scyliorhinidae	Carcharhiniformes	16
Scyliorhinus	*haeckelii*	(MIRANDA RIBEIRO, 1907)	Scyliorhinidae	Carcharhiniformes	61
Scyliorhinus	*hesperius*	SPRINGER, 1966	Scyliorhinidae	Carcharhiniformes	36
Scyliorhinus	*meadi*	SPRINGER, 1966	Scyliorhinidae	Carcharhiniformes	26
Scyliorhinus	*retifer*	(GARMAN, 1881)	Scyliorhinidae	Carcharhiniformes	91
Scyliorhinus	*stellaris*	(LINNAEUS, 1758)	Scyliorhinidae	Carcharhiniformes	346
Scyliorhinus	*torazame*	(TANAKA, 1908)	Scyliorhinidae	Carcharhiniformes	103
Scyliorhinus	*torrei*	HOWELL RIVERO, 1936	Scyliorhinidae	Carcharhiniformes	23
Scyliorhinus	*ugoi*	SOARES, GADIG & GOMES, 2015	Scyliorhinidae	Carcharhiniformes	6
Eusphyra	*blochii*	(CUVIER, 1816)	Sphyrnidae	Carcharhiniformes	163
Sphyrna	*corona*	SPRINGER, 1940	Sphyrnidae	Carcharhiniformes	50
Sphyrna	*gilberti*	QUATTRO, DRIGGERS, GRADY, ULRICH & ROBERTS, 2013	Sphyrnidae	Carcharhiniformes	5
Sphyrna	*lewini*	(GRIFFITH & SMITH, 1834)	Sphyrnidae	Carcharhiniformes	956
Sphyrna	*media*	SPRINGER, 1940	Sphyrnidae	Carcharhiniformes	79
Sphyrna	*mokarran*	(RÜPPELL, 1837)	Sphyrnidae	Carcharhiniformes	486
Sphyrna	*tiburo*	(LINNAEUS, 1758)	Sphyrnidae	Carcharhiniformes	460
Sphyrna	*tudes*	(VALENCIENNES, 1822)	Sphyrnidae	Carcharhiniformes	163
Sphyrna	*zygaena*	(LINNAEUS, 1758)	Sphyrnidae	Carcharhiniformes	772
Furgaleus	*macki*	(WHITLEY, 1943)	Triakidae	Carcharhiniformes	54
Galeorhinus	*galeus*	(LINNAEUS, 1758)	Triakidae	Carcharhiniformes	711
Gogolia	*filewoodi*	COMPAGNO, 1973	Triakidae	Carcharhiniformes	16
Hemitriakis	*abdita*	COMPAGNO & STEVENS, 1993	Triakidae	Carcharhiniformes	15
Hemitriakis	*complicofasciata*	TAKAHASHI & NAKAYA, 2004	Triakidae	Carcharhiniformes	10
Hemitriakis	*falcata*	COMPAGNO & STEVENS, 1993	Triakidae	Carcharhiniformes	21
Hemitriakis	*indroyonoi*	WHITE, COMPAGNO &	Triakidae	Carcharhiniformes	6

		DHARMADI, 2009			
Hemitriakis	*japanica*	(MÜLLER & HENLE, 1839)	Triakidae	Carcharhiniformes	70
Hemitriakis	*leucoperiptera*	HERRE, 1923	Triakidae	Carcharhiniformes	18
Hypogaleus	*hyugaensis*	(MIYOSI, 1939)	Triakidae	Carcharhiniformes	50
Iago	*garricki*	FOURMANOIR, 1979	Triakidae	Carcharhiniformes	30
Iago	*omanensis*	(NORMAN, 1939)	Triakidae	Carcharhiniformes	86
Mustelus	*albipinnis*	CASTRO-AGUIRRE, ATUNA-MENDIOLA, GONZÁZ-ACOSTA & DE LA CRUZ-AGÜERO, 2005	Triakidae	Carcharhiniformes	20
Mustelus	*antarcticus*	GÜNTHER, 1870	Triakidae	Carcharhiniformes	166
Mustelus	*asterias*	CLOQUET, 1819	Triakidae	Carcharhiniformes	179
Mustelus	*californicus*	GILL, 1864	Triakidae	Carcharhiniformes	104
Mustelus	*canis*	(MITCHILL, 1815)	Triakidae	Carcharhiniformes	412
Mustelus	*dorsalis*	GILL, 1864	Triakidae	Carcharhiniformes	52
Mustelus	*fasciatus*	(GARMAN, 1913)	Triakidae	Carcharhiniformes	35
Mustelus	*griseus*	PIETSCHMANN, 1908	Triakidae	Carcharhiniformes	70
Mustelus	*henlei*	(GILL, 1863)	Triakidae	Carcharhiniformes	145
Mustelus	*higmani*	SPRINGER & LOWE, 1963	Triakidae	Carcharhiniformes	54
Mustelus	*lenticulatus*	PHILLIPPS, 1932	Triakidae	Carcharhiniformes	65
Mustelus	*lunulatus*	JORDAN & GILBERT, 1882	Triakidae	Carcharhiniformes	103
Mustelus	*manazo*	BLEEKER, 1854	Triakidae	Carcharhiniformes	177
Mustelus	*mangalorensis*	CUBELIO, REMYA & KURUP, 2011	Triakidae	Carcharhiniformes	6
Mustelus	*mento*	COPE, 1877	Triakidae	Carcharhiniformes	46
Mustelus	*minicanis*	HEEMSTRA, 1997	Triakidae	Carcharhiniformes	16
Mustelus	*mosis*	HEMPRICH & EHRENBERG, 1899	Triakidae	Carcharhiniformes	82
Mustelus	*mustelus*	(LINNAEUS, 1758)	Triakidae	Carcharhiniformes	470
Mustelus	*norrisi*	SPRINGER, 1939	Triakidae	Carcharhiniformes	73

Mustelus	*palumbes*	SMITH, 1957	Triakidae	Carcharhiniformes	34
Mustelus	*punctulatus*	RISSO, 1827	Triakidae	Carcharhiniformes	92
Mustelus	*ravidus*	WHITE & LAST, 2006	Triakidae	Carcharhiniformes	11
Mustelus	*schmitti*	SPRINGER, 1939	Triakidae	Carcharhiniformes	129
Mustelus	*sinusmexicanus*	HEEMSTRA, 1997	Triakidae	Carcharhiniformes	20
Mustelus	*stevensi*	WHITE & LAST, 2008	Triakidae	Carcharhiniformes	15
Mustelus	*walkeri*	WHITE & LAST, 2008	Triakidae	Carcharhiniformes	11
Mustelus	*whitneyi*	CHIRICHIGNO, 1973	Triakidae	Carcharhiniformes	23
Mustelus	*widodoi*	WHITE & LAST, 2006	Triakidae	Carcharhiniformes	11
Scylliogaleus	*quecketti*	BOULENGER, 1902	Triakidae	Carcharhiniformes	36
Triakis	*acutipinna*	KATO, 1968	Triakidae	Carcharhiniformes	16
Triakis	*maculata*	KNER & STEINDACHNER, 1867	Triakidae	Carcharhiniformes	35
Triakis	*megalopterus*	(SMITH, 1839)	Triakidae	Carcharhiniformes	53
Triakis	*scyllium*	MÜLLER & HENLE, 1839	Triakidae	Carcharhiniformes	141
Triakis	*semifasciata*	GIRARD, 1855	Triakidae	Carcharhiniformes	253
Echinorhinus	*brucus*	(BONNATERRE, 1788)	Echinorhinidae	Echinorhiniformes	263
Echinorhinus	*cookei*	PIETSCHMANN, 1928	Echinorhinidae	Echinorhiniformes	113
Heterodontus	*francisci*	(GIRARD, 1855)	Heterodontidae	Heterodontiformes	192
Heterodontus	*galeatus*	(GÜNTHER, 1870)	Heterodontidae	Heterodontiformes	45
Heterodontus	*japonicus*	MACLAY & MACLEAY, 1884	Heterodontidae	Heterodontiformes	78
Heterodontus	*mexicanus*	TAYLOR & CASTRO-AGUIRRE, 1972	Heterodontidae	Heterodontiformes	47
Heterodontus	*omanensis*	BALDWIN, 2005	Heterodontidae	Heterodontiformes	10
Heterodontus	*portusjacksoni*	(MEYER, 1793)	Heterodontidae	Heterodontiformes	243
Heterodontus	*quoyi*	(FRÉMINVILLE, 1840)	Heterodontidae	Heterodontiformes	41
Heterodontus	*ramalheira*	(SMITH, 1949)	Heterodontidae	Heterodontiformes	28
Heterodontus	*zebra*	(GRAY, 1831)	Heterodontidae	Heterodontiformes	68

Chlamydoselachus	*africana*	EBERT & COMPAGNO, 2009	Chlamydoselachidae	Hexanchiformes	12
Chlamydoselachus	*anguineus*	GARMAN, 1884	Chlamydoselachidae	Hexanchiformes	217
Heptranchias	*perlo*	(BONNATERRE, 1788)	Hexanchidae	Hexanchiformes	385
Hexanchus	*griseus*	(BONNATERRE, 1788)	Hexanchidae	Hexanchiformes	660
Hexanchus	*nakamurai*	TENG, 1962	Hexanchidae	Hexanchiformes	114
Hexanchus	*vitulus*	SPRINGER & WALLER, 1969	Hexanchidae	Hexanchiformes	43
Notorynchus	*cepedianus*	(PÉRON, 1807)	Hexanchidae	Hexanchiformes	358
Alopias	*pelagicus*	NAKAMURA, 1935	Alopiidae	Lamniformes	305
Alopias	*superciliosus*	(LOWE, 1841)	Alopiidae	Lamniformes	486
Alopias	*vulpinus*	(BONNATERRE, 1788)	Alopiidae	Lamniformes	695
Carcharias	*taurus*	RAFINESQUE, 1810	Carchariidae	Lamniformes	684
Cetorhinus	*maximus*	(GUNNERUS, 1765)	Cetorhinidae	Lamniformes	660
Carcharodon	*carcharias*	(LINNAEUS, 1758)	Lamnidae	Lamniformes	1334
Isurus	*oxyrinchus*	RAFINESQUE, 1810	Lamnidae	Lamniformes	1214
Isurus	*paucus*	GUITART MANDAY, 1966	Lamnidae	Lamniformes	234
Lamna	*ditropis*	HUBBS & FOLLETT, 1947	Lamnidae	Lamniformes	179
Lamna	*nasus*	(BONNATERRE, 1788)	Lamnidae	Lamniformes	527
Megachasma	*pelagios*	TAYLOR, COMPAGNO & STRUHSAKER, 1983	Megachasmidae	Lamniformes	145
Mitsukurina	*owstoni*	JORDAN, 1898	Mitsukurinidae	Lamniformes	151
Odontaspis	*ferox*	(RISSO, 1810)	Odontaspididae	Lamniformes	241
Odontaspis	*noronhai*	(MAUL, 1955)	Odontaspididae	Lamniformes	70
Pseudocarcharias	*kamoharai*	(MATSUBARA, 1936)	Pseudocarchariidae	Lamniformes	219
Brachaelurus	*colcloughi*	OGILBY, 1908	Brachaeluridae	Orectolobiformes	30
Brachaelurus	*waddi*	(BLOCH & SCHNEIDER, 1801)	Brachaeluridae	Orectolobiformes	48
Ginglymostoma	*cirratum*	(BONNATERRE, 1788)	Ginglymostomatidae	Orectolobiformes	558
Ginglymostoma	*unami*	DEL MORAL-FLORES,	Ginglymostomatidae	Orectolobiformes	11

		RAMÍREZ-ANTONIO, ANGULO & PÉREZ-PONCE DE LEÓN, 2015			
Nebrius	*ferrugineus*	(LESSON, 1831)	Ginglymostomatidae	Orectolobiformes	255
Pseudoginglymostoma	*brevicaudatum*	(GÜNTHER, 1867)	Ginglymostomatidae	Orectolobiformes	31
Chiloscyllium	*arabicum*	GUBANOV, 1980	Hemiscylliidae	Orectolobiformes	46
Chiloscyllium	*burmensis*	DINGERKUS & DE FINO, 1983	Hemiscylliidae	Orectolobiformes	12
Chiloscyllium	*caeruleopunctatum*	PELLEGRIN, 1914	Hemiscylliidae	Orectolobiformes	10
Chiloscyllium	*griseum*	MÜLLER & HENLE, 1838	Hemiscylliidae	Orectolobiformes	123
Chiloscyllium	*hasseltii*	BLEEKER, 1852	Hemiscylliidae	Orectolobiformes	37
Chiloscyllium	*indicum*	(GMELIN, 1789)	Hemiscylliidae	Orectolobiformes	127
Chiloscyllium	*plagiosum*	(BENNETT, 1830)	Hemiscylliidae	Orectolobiformes	193
Chiloscyllium	*punctatum*	MÜLLER & HENLE, 1838	Hemiscylliidae	Orectolobiformes	226
Hemiscyllium	*freycineti*	(QUOY & GAIMARD, 1824)	Hemiscylliidae	Orectolobiformes	32
Hemiscyllium	*galei*	ALLEN & ERDMANN, 2008	Hemiscylliidae	Orectolobiformes	7
Hemiscyllium	*hallstromi*	WHITLEY, 1967	Hemiscylliidae	Orectolobiformes	21
Hemiscyllium	*halmahera*	ALLEN, ERDMANN & DUDGEON, 2013	Hemiscylliidae	Orectolobiformes	5
Hemiscyllium	*henryi*	ALLEN & ERDMANN, 2008	Hemiscylliidae	Orectolobiformes	7
Hemiscyllium	*michaeli*	ALLEN & DUDGEON, 2010	Hemiscylliidae	Orectolobiformes	9
Hemiscyllium	*ocellatum*	(BONNATERRE, 1788)	Hemiscylliidae	Orectolobiformes	137
Hemiscyllium	*strahani*	WHITLEY, 1967	Hemiscylliidae	Orectolobiformes	22
Hemiscyllium	*trispeculare*	RICHARDSON, 1843	Hemiscylliidae	Orectolobiformes	41
Eucrossorhinus	*dasypogon*	(BLEEKER, 1867)	Orectolobidae	Orectolobiformes	49
Orectolobus	*floridus*	LAST & CHIDLOW, 2008	Orectolobidae	Orectolobiformes	12
Orectolobus	*halei*	WHITLEY, 1940	Orectolobidae	Orectolobiformes	29
Orectolobus	*hutchinsi*	LAST, CHIDLOW & COMPAGNO, 2006	Orectolobidae	Orectolobiformes	24
Orectolobus	*japonicus*	REGAN, 1906	Orectolobidae	Orectolobiformes	59

Orectolobus	*leptolineatus*	LAST, WHITE & POGONOSKI, 2010	Orectolobidae	Orectolobiformes	14
Orectolobus	*maculatus*	(BONNATERRE, 1788)	Orectolobidae	Orectolobiformes	140
Orectolobus	*ornatus*	(DE VIS, 1883)	Orectolobidae	Orectolobiformes	99
Orectolobus	*parvimaculatus*	LAST & CHIDLOW, 2008	Orectolobidae	Orectolobiformes	16
Orectolobus	*reticulatus*	LAST, POGONOSKI & WHITE, 2008	Orectolobidae	Orectolobiformes	9
Orectolobus	*wardi*	WHITLEY, 1939	Orectolobidae	Orectolobiformes	24
Sutorectus	*tentaculatus*	(PETERS, 1864)	Orectolobidae	Orectolobiformes	38
Cirrhoscyllium	*expolitum*	SMITH & RADCLIFFE, 1913	Parascylliidae	Orectolobiformes	21
Cirrhoscyllium	*formosanum*	TENG, 1959	Parascylliidae	Orectolobiformes	19
Cirrhoscyllium	*japonicum*	KAMOHARA, 1943	Parascylliidae	Orectolobiformes	18
Parascyllium	*collare*	RAMSAY & OGILBY, 1888	Parascylliidae	Orectolobiformes	26
Parascyllium	*elongatum*	LAST & STEVENS, 2008	Parascylliidae	Orectolobiformes	6
Parascyllium	*ferrugineum*	MCCULLOCH, 1911	Parascylliidae	Orectolobiformes	33
Parascyllium	*sparsimaculatum*	GOTO & LAST, 2002	Parascylliidae	Orectolobiformes	10
Parascyllium	*variolatum*	(DUMÉRIL, 1853)	Parascylliidae	Orectolobiformes	33
Rhincodon	*typus*	SMITH, 1828	Rhincodontidae	Orectolobiformes	790
Stegostoma	*fasciatum*	(HERMANN, 1783)	Stegostomatidae	Orectolobiformes	364
Pliotrema	*warreni*	REGAN, 1906	Pristiophoridae	Pristiophoriformes	53
Pristiophorus	*cirratus*	(LATHAM, 1794)	Pristiophoridae	Pristiophoriformes	83
Pristiophorus	*delicatus*	YEARSLEY, LAST & WHITE, 2008	Pristiophoridae	Pristiophoriformes	11
Pristiophorus	*japonicus*	GÜNTHER, 1870	Pristiophoridae	Pristiophoriformes	70
Pristiophorus	*lanae*	EBERT & WILMS, 2013	Pristiophoridae	Pristiophoriformes	6
Pristiophorus	*nancyae*	EBERT & CAILLIET, 2011	Pristiophoridae	Pristiophoriformes	14
Pristiophorus	*nudipinnis*	GÜNTHER, 1870	Pristiophoridae	Pristiophoriformes	58
Pristiophorus	*schroederi*	SPRINGER & BULLIS, 1960	Pristiophoridae	Pristiophoriformes	23
Centrophorus	*atromarginatus*	GARMAN, 1913	Centrophoridae	Squaliformes	49

Centrophorus	*granulosus*	(BLOCH & SCHNEIDER, 1801)	Centrophoridae	Squaliformes	505
Centrophorus	*harrissoni*	MCCULLOCH, 1915	Centrophoridae	Squaliformes	35
Centrophorus	*isodon*	(CHU, MENG & LIU, 1981)	Centrophoridae	Squaliformes	23
Centrophorus	*lesliei*	WHITE, EBERT & NAYLOR, 2017	Centrophoridae	Squaliformes	5
Centrophorus	*longipinnis*	WHITE, EBERT & NAYLOR, 2017	Centrophoridae	Squaliformes	5
Centrophorus	*moluccensis*	BLEEKER, 1860	Centrophoridae	Squaliformes	108
Centrophorus	*seychellorum*	BARANES, 2003	Centrophoridae	Squaliformes	7
Centrophorus	*squamosus*	(BONNATERRE, 1788)	Centrophoridae	Squaliformes	305
Centrophorus	*tessellatus*	GARMAN, 1906	Centrophoridae	Squaliformes	33
Centrophorus	*uyato*	(RAFINESQUE, 1810)	Centrophoridae	Squaliformes	125
Centrophorus	*westraliensis*	WHITE, EBERT & COMPAGNO, 2008	Centrophoridae	Squaliformes	8
Centrophorus	*zeehaani*	WHITE, EBERT & COMPAGNO, 2008	Centrophoridae	Squaliformes	29
Deania	*calcea*	(LOWE, 1839)	Centrophoridae	Squaliformes	280
Deania	*hystricosa*	(GARMAN, 1906)	Centrophoridae	Squaliformes	52
Deania	*profundorum*	(SMITH & RADCLIFFE, 1912)	Centrophoridae	Squaliformes	118
Deania	*quadrispinosa*	(MCCULLOCH, 1915)	Centrophoridae	Squaliformes	48
Dalatias	*licha*	(BONNATERRE, 1788)	Dalatiidae	Squaliformes	441
Euprotomicroides	*zantedeschia*	HULLEY & PENRITH, 1966	Dalatiidae	Squaliformes	30
Euprotomicrus	*bispinatus*	(QUOY & GAIMARD, 1824)	Dalatiidae	Squaliformes	107
Heteroscymnoides	*marleyi*	FOWLER, 1934	Dalatiidae	Squaliformes	37
Isistius	*brasiliensis*	(QUOY & GAIMARD, 1824)	Dalatiidae	Squaliformes	244
Isistius	*plutodus*	GARRICK & SPRINGER, 1964	Dalatiidae	Squaliformes	58
Mollisquama	*mississippiensis*	GRACE, DOOSEY, DENTON, NAYLOR, BART & MAISEY, 2019	Dalatiidae	Squaliformes	1
Mollisquama	*parini*	DOLGANOV, 1984	Dalatiidae	Squaliformes	21
Squaliolus	*aliae*	TENG, 1959	Dalatiidae	Squaliformes	43
Squaliolus	*laticaudus*	SMITH & RADCLIFFE, 1912	Dalatiidae	Squaliformes	96

Aculeola	*nigra*	DE BUEN, 1959	Etmopteridae	Squaliformes	42
Centroscyllium	*excelsum*	SHIRAI & NAKAYA, 1990	Etmopteridae	Squaliformes	12
Centroscyllium	*fabricii*	(REINHARDT, 1825)	Etmopteridae	Squaliformes	159
Centroscyllium	*granulatum*	GÜNTHER, 1887	Etmopteridae	Squaliformes	28
Centroscyllium	*kamoharai*	ABE, 1966	Etmopteridae	Squaliformes	35
Centroscyllium	*nigrum*	GARMAN, 1899	Etmopteridae	Squaliformes	57
Centroscyllium	*ornatum*	(ALCOCK, 1889)	Etmopteridae	Squaliformes	26
Centroscyllium	*ritteri*	JORDAN & FOWLER, 1903	Etmopteridae	Squaliformes	43
Etmopterus	*alphus*	EBERT, STRAUBE, LESLIE & WEIGMANN, 2016	Etmopteridae	Squaliformes	5
Etmopterus	*benchleyi*	VÁSQUEZ, EBERT & LONG, 2015	Etmopteridae	Squaliformes	6
Etmopterus	*bigelowi*	SHIRAI & TACHIKAWA, 1993	Etmopteridae	Squaliformes	53
Etmopterus	*brachyurus*	SMITH & RADCLIFFE, 1912	Etmopteridae	Squaliformes	54
Etmopterus	*bullisi*	BIGELOW & SCHROEDER, 1957	Etmopteridae	Squaliformes	33
Etmopterus	*burgessi*	SCHAAF-DA SILVA & EBERT, 2006	Etmopteridae	Squaliformes	9
Etmopterus	*carteri*	SPRINGER & BURGESS, 1985	Etmopteridae	Squaliformes	16
Etmopterus	*caudistigmus*	LAST, BURGESS & SÉRET, 2002	Etmopteridae	Squaliformes	9
Etmopterus	*compagnoi*	FRICKE & KOCH, 1990	Etmopteridae	Squaliformes	14
Etmopterus	*decacuspidatus*	CHAN, 1966	Etmopteridae	Squaliformes	14
Etmopterus	*dianthus*	LAST, BURGESS & SÉRET, 2002	Etmopteridae	Squaliformes	16
Etmopterus	*dislineatus*	LAST, BURGESS & SÉRET, 2002	Etmopteridae	Squaliformes	17
Etmopterus	*evansi*	LAST, BURGESS & SÉRET, 2002	Etmopteridae	Squaliformes	12
Etmopterus	*fusus*	LAST, BURGESS & SÉRET, 2002	Etmopteridae	Squaliformes	15
Etmopterus	*gracilispinis*	KREFFT, 1968	Etmopteridae	Squaliformes	61
Etmopterus	*granulosus*	(GÜNTHER, 1880)	Etmopteridae	Squaliformes	162
Etmopterus	*hillianus*	(POEY, 1861)	Etmopteridae	Squaliformes	50
Etmopterus	*joungi*	KNUCKEY, EBERT & BURGESS, 2011	Etmopteridae	Squaliformes	7

Etmopterus	*lailae*	EBERT, PAPASTAMATIOU, KAJIURA & WETHERBEE, 2017	Etmopteridae	Squaliformes	3
Etmopterus	*litvinovi*	PARIN & KOTLYAR, 1990	Etmopteridae	Squaliformes	12
Etmopterus	*lucifer*	JORDAN & SNYDER, 1902	Etmopteridae	Squaliformes	152
Etmopterus	*marshae*	EBERT & VAN HEES, 2018	Etmopteridae	Squaliformes	2
Etmopterus	*molleri*	(WHITLEY, 1939)	Etmopteridae	Squaliformes	53
Etmopterus	*parini*	DOLGANOV & BALANOV, 2018	Etmopteridae	Squaliformes	1
Etmopterus	*perryi*	SPRINGER & BURGESS, 1985	Etmopteridae	Squaliformes	23
Etmopterus	*polli*	BIGELOW, SCHROEDER & SPRINGER, 1953	Etmopteridae	Squaliformes	27
Etmopterus	*princeps*	COLLETT, 1904	Etmopteridae	Squaliformes	109
Etmopterus	*pseudosqualiolus*	LAST, BURGESS & SÉRET, 2002	Etmopteridae	Squaliformes	12
Etmopterus	*pusillus*	(LOWE, 1839)	Etmopteridae	Squaliformes	188
Etmopterus	*pycnolepis*	KOTLYAR, 1990	Etmopteridae	Squaliformes	11
Etmopterus	*robinsi*	SCHOFIELD & BURGESS, 1997	Etmopteridae	Squaliformes	20
Etmopterus	*samadiae*	WHITE, EBERT, MANA & CORRIGAN, 2017	Etmopteridae	Squaliformes	5
Etmopterus	*schmidti*	DOLGANOV, 1986	Etmopteridae	Squaliformes	3
Etmopterus	*schultzi*	BIGELOW, SCHROEDER & SPRINGER, 1953	Etmopteridae	Squaliformes	40
Etmopterus	*sculptus*	EBERT, COMPAGNO & DE VRIES, 2011	Etmopteridae	Squaliformes	11
Etmopterus	*sentosus*	BASS, D'AUBREY & KISTNASAMY, 1976	Etmopteridae	Squaliformes	20
Etmopterus	*sheikoi*	(DOLGANOV, 1986)	Etmopteridae	Squaliformes	25
Etmopterus	*spinax*	(LINNAEUS, 1758)	Etmopteridae	Squaliformes	429
Etmopterus	*splendidus*	YANO, 1988	Etmopteridae	Squaliformes	25
Etmopterus	*tasmaniensis*	MYAGKOV & PAVLOV, 1986	Etmopteridae	Squaliformes	2
Etmopterus	*unicolor*	(ENGELHARDT, 1912)	Etmopteridae	Squaliformes	44
Etmopterus	*viator*	STRAUBE, 2011	Etmopteridae	Squaliformes	13

Etmopterus	*villosus*	GILBERT, 1905	Etmopteridae	Squaliformes	21
Etmopterus	*virens*	BIGELOW, SCHROEDER & SPRINGER, 1953	Etmopteridae	Squaliformes	43
Trigonognathus	*kabeyai*	MOCHIZUKI & OHE, 1990	Etmopteridae	Squaliformes	33
Oxynotus	*bruniensis*	(OGILBY, 1893)	Oxynotidae	Squaliformes	53
Oxynotus	*caribbaeus*	CERVIGÓN, 1961	Oxynotidae	Squaliformes	25
Oxynotus	*centrina*	(LINNAEUS, 1758)	Oxynotidae	Squaliformes	212
Oxynotus	*japonicus*	YANO & MUROFUSHI, 1985	Oxynotidae	Squaliformes	14
Oxynotus	*paradoxus*	FRADE, 1929	Oxynotidae	Squaliformes	52
Centroscymnus	*coelolepis*	BARBOSA DU BOCAGE & DE BRITO CAPELLO, 1864	Somniosidae	Squaliformes	270
Centroscymnus	*owstonii*	GARMAN, 1906	Somniosidae	Squaliformes	165
Centroselachus	*crepidater*	(BARBOSA DU BOCAGE & DE BRITO CAPELLO, 1864)	Somniosidae	Squaliformes	198
Scymnodalatias	*albicauda*	TANIUCHI & GARRICK, 1986	Somniosidae	Squaliformes	29
Scymnodalatias	*garricki*	KUKUEV & KONOVALENKO, 1988	Somniosidae	Squaliformes	23
Scymnodalatias	*oligodon*	KUKUEV & KONOVALENKO, 1988	Somniosidae	Squaliformes	13
Scymnodalatias	*sherwoodi*	(ARCHEY, 1921)	Somniosidae	Squaliformes	30
Scymnodon	*ichiharai*	YANO & TANAKA, 1984	Somniosidae	Squaliformes	24
Scymnodon	*macracanthus*	(REGAN, 1906)	Somniosidae	Squaliformes	33
Scymnodon	*plunketi*	(WAITE, 1910)	Somniosidae	Squaliformes	68
Scymnodon	*ringens*	BARBOSA DU BOCAGE & DE BRITO CAPELLO, 1864	Somniosidae	Squaliformes	88
Somniosus	*antarcticus*	WHITLEY, 1939	Somniosidae	Squaliformes	41
Somniosus	*longus*	(TANAKA, 1912)	Somniosidae	Squaliformes	23
Somniosus	*microcephalus*	(BLOCH & SCHNEIDER, 1801)	Somniosidae	Squaliformes	287
Somniosus	*pacificus*	BIGELOW & SCHROEDER, 1944	Somniosidae	Squaliformes	117

Somniosus	*rostratus*	(RISSO, 1827)	Somniosidae	Squaliformes	96
Zameus	*squamulosus*	(GÜNTHER, 1877)	Somniosidae	Squaliformes	189
Cirrhigaleus	*asper*	(MERRETT, 1973)	Squalidae	Squaliformes	57
Cirrhigaleus	*australis*	WHITE, LAST & STEVENS, 2007	Squalidae	Squaliformes	20
Cirrhigaleus	*barbifer*	TANAKA, 1912	Squalidae	Squaliformes	46
Squalus	*acanthias*	LINNAEUS, 1758	Squalidae	Squaliformes	1566
Squalus	*acutipinnis*	REGAN, 1908	Squalidae	Squaliformes	13
Squalus	*albicaudus*	VIANA, DE CARVALHO & GOMES, 2016	Squalidae	Squaliformes	6
Squalus	*albifrons*	LAST, WHITE & STEVENS, 2007	Squalidae	Squaliformes	17
Squalus	*altipinnis*	LAST, WHITE & STEVENS, 2007	Squalidae	Squaliformes	10
Squalus	*bahiensis*	VIANA, DE CARVALHO & GOMES, 2016	Squalidae	Squaliformes	6
Squalus	*bassi*	VIANA, DE CARVALHO & EBERT, 2017	Squalidae	Squaliformes	3
Squalus	*blainville*	(RISSO, 1827)	Squalidae	Squaliformes	232
Squalus	*boretzi*	DOLGANOV, 2019	Squalidae	Squaliformes	1
Squalus	*brevirostris*	TANAKA, 1917	Squalidae	Squaliformes	33
Squalus	*bucephalus*	LAST, SÉRET & POGONOSKI, 2007	Squalidae	Squaliformes	7
Squalus	*chloroculus*	LAST, WHITE & MOTOMURA, 2007	Squalidae	Squaliformes	18
Squalus	*clarkae*	PFLEGER, GRUBBS, COTTON & DALY-ENGEL, 2018	Squalidae	Squaliformes	4
Squalus	*crassispinus*	LAST, EDMUNDS & YEARSLEY, 2007	Squalidae	Squaliformes	16
Squalus	*cubensis*	HOWELL RIVERO, 1936	Squalidae	Squaliformes	105
Squalus	*edmundsi*	WHITE, LAST & STEVENS, 2007	Squalidae	Squaliformes	20
Squalus	*formosus*	WHITE & IGLÉSIAS, 2011	Squalidae	Squaliformes	9
Squalus	*grahami*	WHITE, LAST & STEVENS, 2007	Squalidae	Squaliformes	16
Squalus	*griffini*	PHILLIPPS, 1931	Squalidae	Squaliformes	24
Squalus	*hawaiiensis*	DALY-ENGEL, KOCH,	Squalidae	Squaliformes	2

		ANDERSON, COTTON & GRUBBS, 2018			
Squalus	*hemipinnis*	WHITE, LAST & YEARSLEY, 2007	Squalidae	Squaliformes	19
Squalus	*japonicus*	ISHIKAWA, 1908	Squalidae	Squaliformes	44
Squalus	*lalannei*	BARANES, 2003	Squalidae	Squaliformes	7
Squalus	*lobularis*	VIANA, DE CARVALHO & GOMES, 2016	Squalidae	Squaliformes	5
Squalus	*mahia*	VIANA, LISHER & DE CARVALHO, 2017	Squalidae	Squaliformes	4
Squalus	*margaretsmithae*	VIANA, LISHER & DE CARVALHO, 2017	Squalidae	Squaliformes	3
Squalus	*megalops*	(MACLEAY, 1881)	Squalidae	Squaliformes	209
Squalus	*melanurus*	FOURMANOIR, 1979	Squalidae	Squaliformes	36
Squalus	*mitsukurii*	JORDAN & SNYDER, 1903	Squalidae	Squaliformes	176
Squalus	*montalbani*	WHITLEY, 1931	Squalidae	Squaliformes	34
Squalus	*nasutus*	LAST, MARSHALL & WHITE, 2007	Squalidae	Squaliformes	17
Squalus	*notocaudatus*	LAST, WHITE & STEVENS, 2007	Squalidae	Squaliformes	9
Squalus	*probatovi*	MYAGKOV & KONDYURIN, 1986	Squalidae	Squaliformes	4
Squalus	*quasimodo*	VIANA, DE CARVALHO & GOMES, 2016	Squalidae	Squaliformes	7
Squalus	*raoulensis*	DUFFY & LAST, 2007	Squalidae	Squaliformes	11
Squalus	*suckleyi*	(GIRARD, 1855)	Squalidae	Squaliformes	108
Squatina	*aculeata*	CUVIER, 1829	Squatinidae	Squatiniformes	86
Squatina	*africana*	REGAN, 1908	Squatinidae	Squatiniformes	50
Squatina	*albipunctata*	LAST & WHITE, 2008	Squatinidae	Squatiniformes	17
Squatina	*argentina*	(MARINI, 1930)	Squatinidae	Squatiniformes	47
Squatina	*armata*	(PHILIPPI, 1887)	Squatinidae	Squatiniformes	29
Squatina	*australis*	REGAN, 1906	Squatinidae	Squatiniformes	52
Squatina	*caillieti*	WALSH, EBERT & COMPAGNO, 2011	Squatinidae	Squatiniformes	5
Squatina	*californica*	AYRES, 1859	Squatinidae	Squatiniformes	136

Squatina	*david*	ACERO, TAVERA, ANGUILA & HERNÁNDEZ, 2016	Squatinidae	Squatiniformes	7
Squatina	*dumeril*	LESUEUR, 1818	Squatinidae	Squatiniformes	103
Squatina	*formosa*	SHEN & TING, 1972	Squatinidae	Squatiniformes	26
Squatina	*guggenheim*	MARINI, 1936	Squatinidae	Squatiniformes	92
Squatina	*heteroptera*	CASTRO-AGUIRRE, ESPINOSA PÉREZ & HUIDOBRO CAMPOS, 2007	Squatinidae	Squatiniformes	7
Squatina	*japonica*	BLEEKER, 1858	Squatinidae	Squatiniformes	60
Squatina	*legnota*	LAST & WHITE, 2008	Squatinidae	Squatiniformes	10
Squatina	*mexicana*	CASTRO-AGUIRRE, ESPINOSA PÉREZ & HUIDOBRO CAMPOS, 2007	Squatinidae	Squatiniformes	7
Squatina	*nebulosa*	REGAN, 1906	Squatinidae	Squatiniformes	42
Squatina	*occulta*	VOOREN & DA SILVA, 1991	Squatinidae	Squatiniformes	35
Squatina	*oculata*	BONAPARTE, 1840	Squatinidae	Squatiniformes	84
Squatina	*pseudocellata*	LAST & WHITE, 2008	Squatinidae	Squatiniformes	11
Squatina	*squatina*	(LINNAEUS, 1758)	Squatinidae	Squatiniformes	336
Squatina	*tergocellata*	MCCULLOCH, 1914	Squatinidae	Squatiniformes	29
Squatina	*tergocellatoides*	CHEN, 1963	Squatinidae	Squatiniformes	24
Squatina	*varii*	VAZ & DE CARVALHO, 2018	Squatinidae	Squatiniformes	3

3.3.3.2 "Top 20" most studied shark species

Genus	Species	Author	Family	Order	No of records
Squalus	*acanthias*	LINNAEUS, 1758	Squalidae	Squaliformes	1566
Prionace	*glauca*	(LINNAEUS, 1758)	Carcharhinidae	Carcharhiniformes	1379
Carcharodon	*carcharias*	(LINNAEUS, 1758)	Lamnidae	Lamniformes	1334
Isurus	*oxyrinchus*	RAFINESQUE, 1810	Lamnidae	Lamniformes	1214
Scyliorhinus	*canicula*	(LINNAEUS, 1758)	Scyliorhinidae	Carcharhiniformes	1212
Galeocerdo	*cuvier*	(PÉRON & LESUEUR, 1822)	Carcharhinidae	Carcharhiniformes	1090
Sphyrna	*lewini*	(GRIFFITH & SMITH, 1834)	Sphyrnidae	Carcharhiniformes	956
Carcharhinus	*leucas*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	896
Carcharhinus	*limbatus*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	875
Carcharhinus	*plumbeus*	(NARDO, 1827)	Carcharhinidae	Carcharhiniformes	851
Rhincodon	*typus*	SMITH, 1828	Rhincodontidae	Orectolobiformes	790
Sphyrna	*zygaena*	(LINNAEUS, 1758)	Sphyrnidae	Carcharhiniformes	772
Carcharhinus	*falciformis*	(MÜLLER & HENLE, 1839)	Carcharhinidae	Carcharhiniformes	726
Galeorhinus	*galeus*	(LINNAEUS, 1758)	Triakidae	Carcharhiniformes	711
Alopias	*vulpinus*	(BONNATERRE, 1788)	Alopiidae	Lamniformes	695
Carcharias	*taurus*	RAFINESQUE, 1810	Carchariidae	Lamniformes	684
Hexanchus	*griseus*	(BONNATERRE, 1788)	Hexanchidae	Hexanchiformes	660
Cetorhinus	*maximus*	(GUNNERUS, 1765)	Cetorhinidae	Lamniformes	660
Carcharhinus	*obscurus*	(LESUEUR, 1818)	Carcharhinidae	Carcharhiniformes	645
Negaprion	*brevirostris*	(POEY, 1868)	Carcharhinidae	Carcharhiniformes	611

Order/Family	Number of Species	Number of Records
Carcharhiniformes	**292**	**29330**
Carcharhinidae	56	14886
Hemigaleidae	8	531
Leptochariidae	1	46
Pentanchidae	111	2941
Proscylliidae	6	206
Pseudotriakidae	5	199
Scyliorhinidae	50	3145
Sphyrnidae	9	3134
Triakidae	46	4242
Echinorhiniformes	**2**	**376**
Echinorhinidae	2	376
Heterodontiformes	**9**	**752**
Heterodontidae	9	752
Hexanchiformes	**7**	**1789**
Chlamydoselachidae	2	229
Hexanchidae	5	1560
Lamniformes	**15**	**7144**
Alopiidae	3	1486
Carchariidae	1	684
Cetorhinidae	1	660
Lamnidae	5	3488
Megachasmidae	1	145
Mitsukurinidae	1	151
Odontaspididae	2	311
Pseudocarchariidae	1	219
Orectolobiformes	**45**	**3821**
Brachaeluridae	2	78
Ginglymostomatidae	4	855
Hemiscylliidae	17	1055
Orectolobidae	12	513
Parascylliidae	8	166
Rhincodontidae	1	790
Stegostomatidae	1	364
Pristiophoriformes	**8**	**318**
Pristiophoridae	8	318
Squaliformes	**141**	**10069**
Centrophoridae	17	1735
Dalatiidae	10	1078
Etmopteridae	53	2282
Oxynotidae	5	356
Somniosidae	17	1694
Squalidae	39	2924
Squatiniformes	**24**	**1298**
Squatinidae	24	1298
Total:	**543**	**54897**

3.3.3.3 Complete list of taxonomically valid ray and skate species

Genus	Species	Author	Family	Order	No of records
Hypnos	*monopterygius*	(SHAW, 1795)	Hypnidae	Torpediniformes	54
Benthobatis	*kreffti*	RINCON, STEHMANN & VOOREN, 2001	Narcinidae	Torpediniformes	18
Benthobatis	*marcida*	BEAN & WEED, 1909	Narcinidae	Torpediniformes	27
Benthobatis	*moresbyi*	ALCOCK, 1898	Narcinidae	Torpediniformes	33
Benthobatis	*yangi*	CARVALHO, COMPAGNO & EBERT, 2003	Narcinidae	Torpediniformes	11
Diplobatis	*colombiensis*	FECHHELM & McEACHRAN, 1984	Narcinidae	Torpediniformes	18
Diplobatis	*guamachensis*	MARTÍN SALAZAR, 1957	Narcinidae	Torpediniformes	19
Diplobatis	*ommata*	(JORDAN & GILBERT, 1890)	Narcinidae	Torpediniformes	53
Diplobatis	*picta*	PALMER, 1950	Narcinidae	Torpediniformes	31
Discopyge	*castelloi*	MENNI, RINCON & GARCIA, 2008	Narcinidae	Torpediniformes	5
Discopyge	*tschudii*	HECKEL, 1846	Narcinidae	Torpediniformes	94
Narcine	*atzi*	CARVALHO & RANDALL, 2003	Narcinidae	Torpediniformes	8
Narcine	*baliensis*	DE CARVALHO & WHITE, 2016	Narcinidae	Torpediniformes	4
Narcine	*bancroftii*	(GRIFFITH & SMITH, 1834)	Narcinidae	Torpediniformes	43
Narcine	*brasiliensis*	(OLFERS, 1831)	Narcinidae	Torpediniformes	159
Narcine	*brevilabiata*	BESSEDNOV, 1966	Narcinidae	Torpediniformes	14
Narcine	*brunnea*	ANNANDALE, 1909	Narcinidae	Torpediniformes	23
Narcine	*entemedor*	JORDAN & STARKS, 1895	Narcinidae	Torpediniformes	76
Narcine	*insolita*	CARVALHO, SÉRET & COMPAGNO, 2002	Narcinidae	Torpediniformes	7
Narcine	*leoparda*	CARVALHO, 2001	Narcinidae	Torpediniformes	21
Narcine	*lingula*	RICHARDSON, 1846	Narcinidae	Torpediniformes	23
Narcine	*maculata*	(SHAW, 1804)	Narcinidae	Torpediniformes	53
Narcine	*nigra*	DUMÉRIL, 1852	Narcinidae	Torpediniformes	6

Narcine	*oculifera*	CARVALHO, COMPAGNO & MEE, 2002	Narcinidae	Torpediniformes	12
Narcine	*prodorsalis*	BESSEDNOV, 1966	Narcinidae	Torpediniformes	15
Narcine	*rierai*	(LLORIS & RUCABADO, 1991)	Narcinidae	Torpediniformes	13
Narcine	*timlei*	(BLOCH & SCHNEIDER, 1801)	Narcinidae	Torpediniformes	89
Narcine	*vermiculata*	BREDER, 1928	Narcinidae	Torpediniformes	38
Narcinops	*lasti*	(CARVALHO & SÉRET, 2002)	Narcinidae	Torpediniformes	12
Narcinops	*nelsoni*	(CARVALHO, 2008)	Narcinidae	Torpediniformes	10
Narcinops	*ornata*	(CARVALHO, 2008)	Narcinidae	Torpediniformes	7
Narcinops	*tasmaniensis*	(RICHARDSON, 1841)	Narcinidae	Torpediniformes	34
Narcinops	*westraliensis*	(MCKAY, 1966)	Narcinidae	Torpediniformes	14
Electrolux	*addisoni*	COMPAGNO & HEEMSTRA, 2007	Narkidae	Torpediniformes	7
Heteronarce	*bentuviai*	(BARANES & RANDALL, 1989)	Narkidae	Torpediniformes	14
Heteronarce	*garmani*	REGAN, 1921	Narkidae	Torpediniformes	28
Heteronarce	*mollis*	(LLOYD, 1907)	Narkidae	Torpediniformes	24
Narke	*capensis*	(GMELIN, 1789)	Narkidae	Torpediniformes	44
Narke	*dipterygia*	(BLOCH & SCHNEIDER, 1801)	Narkidae	Torpediniformes	60
Narke	*japonica*	(TEMMINCK & SCHLEGEL, 1850)	Narkidae	Torpediniformes	89
Temera	*hardwickii*	GRAY, 1831	Narkidae	Torpediniformes	33
Typhlonarke	*aysoni*	(HAMILTON, 1902)	Narkidae	Torpediniformes	43
Tetranarce	*occidentalis*	(STORER, 1843)	Torpedinidae	Torpediniformes	28
Tetronarce	*californica*	(AYRES, 1855)	Torpedinidae	Torpediniformes	125
Tetronarce	*cowleyi*	EBERT, HAAS & DE CARVALHO, 2015	Torpedinidae	Torpediniformes	9
Tetronarce	*formosa*	(HAAS & EBERT, 2006)	Torpedinidae	Torpediniformes	12
Tetronarce	*nobiliana*	(BONAPARTE, 1835)	Torpedinidae	Torpediniformes	258
Tetronarce	*puelcha*	(LAHILLE, 1926)	Torpedinidae	Torpediniformes	29
Tetronarce	*tokionis*	(TANAKA, 1908)	Torpedinidae	Torpediniformes	32

Tetronarce	*tremens*	(DE BUEN, 1959)	Torpedinidae	Torpediniformes	71
Torpedo	*adenensis*	CARVALHO, STEHMANN & MANILO, 2002	Torpedinidae	Torpediniformes	9
Torpedo	*alexandrinsis*	MAZHAR, 1987	Torpedinidae	Torpediniformes	5
Torpedo	*andersoni*	BULLIS, 1962	Torpedinidae	Torpediniformes	21
Torpedo	*bauchotae*	CADENAT, CAPAPÉ & DESOUTTER, 1978	Torpedinidae	Torpediniformes	15
Torpedo	*fuscomaculata*	PETERS, 1855	Torpedinidae	Torpediniformes	47
Torpedo	*mackayana*	METZELAAR, 1919	Torpedinidae	Torpediniformes	18
Torpedo	*marmorata*	RISSO, 1810	Torpedinidae	Torpediniformes	387
Torpedo	*panthera*	OLFERS, 1831	Torpedinidae	Torpediniformes	38
Torpedo	*sinuspersici*	OLFERS, 1831	Torpedinidae	Torpediniformes	73
Torpedo	*suessii*	STEINDACHNER, 1898	Torpedinidae	Torpediniformes	11
Torpedo	*torpedo*	(LINNAEUS, 1758)	Torpedinidae	Torpediniformes	241
Glaucostegus	*cemiculus*	(GEOFFROY SAINT-HILAIRE, 1817)	Glaucostegidae	Rhinopristiformes	111
Glaucostegus	*granulatus*	(CUVIER, 1829)	Glaucostegidae	Rhinopristiformes	133
Glaucostegus	*halavi*	(FORSSKÅL, 1775)	Glaucostegidae	Rhinopristiformes	77
Glaucostegus	*obtusus*	MÜLLER & HENLE, 1841	Glaucostegidae	Rhinopristiformes	41
Glaucostegus	*thouin*	(ANONYMOUS, 1798)	Glaucostegidae	Rhinopristiformes	70
Glaucostegus	*typus*	(BENNETT, 1830)	Glaucostegidae	Rhinopristiformes	179
Platyrhina	*hyugaensis*	IWATSUKI, MIYAMOTO & NAKAYA, 2011	Platyrhinidae	Rhinopristiformes	6
Platyrhina	*psomadakisi*	WHITE & LAST, 2016	Platyrhinidae	Rhinopristiformes	6
Platyrhina	*sinensis*	(BLOCH & SCHNEIDER, 1801)	Platyrhinidae	Rhinopristiformes	64
Platyrhina	*tangi*	IWATSUKI, ZHANG & NAKAYA, 2011	Platyrhinidae	Rhinopristiformes	12
Platyrhinoidis	*triseriata*	(JORDAN & GILBERT, 1880)	Platyrhinidae	Rhinopristiformes	95
Anoxypristis	*cuspidata*	(LATHAM, 1794)	Pristidae	Rhinopristiformes	180
Pristis	*clavata*	GARMAN, 1906	Pristidae	Rhinopristiformes	87

Pristis	*pectinata*	LATHAM, 1794	Pristidae	Rhinopristiformes	304
Pristis	*pristis*	(LINNAEUS, 1758)	Pristidae	Rhinopristiformes	479
Pristis	*zijsron*	BLEEKER, 1851	Pristidae	Rhinopristiformes	179
Rhina	*ancylostoma*	BLOCH & SCHNEIDER, 1801	Rhinidae	Rhinopristiformes	179
Rhynchobatus	*australiae*	WHITLEY, 1939	Rhinidae	Rhinopristiformes	81
Rhynchobatus	*cooki*	LAST, KYNE & COMPAGNO, 2016	Rhinidae	Rhinopristiformes	7
Rhynchobatus	*djiddensis*	(FORSSKÅL, 1775)	Rhinidae	Rhinopristiformes	221
Rhynchobatus	*immaculatus*	LAST, HO & CHEN, 2013	Rhinidae	Rhinopristiformes	9
Rhynchobatus	*laevis*	(BLOCH & SCHNEIDER, 1801)	Rhinidae	Rhinopristiformes	58
Rhynchobatus	*luebberti*	EHRENBAUM, 1915	Rhinidae	Rhinopristiformes	25
Rhynchobatus	*palpebratus*	COMPAGNO & LAST, 2008	Rhinidae	Rhinopristiformes	21
Rhynchobatus	*springeri*	COMPAGNO & LAST, 2010	Rhinidae	Rhinopristiformes	13
Rhynchorhina	*mauritaniensis*	SÉRET & NAYLOR, 2016	Rhinidae	Rhinopristiformes	7
Acroteriobatus	*annulatus*	MÜLLER & HENLE, 1841	Rhinobatidae	Rhinopristiformes	61
Acroteriobatus	*blochii*	(MÜLLER & HENLE, 1841)	Rhinobatidae	Rhinopristiformes	39
Acroteriobatus	*leucospilus*	(NORMAN, 1926)	Rhinobatidae	Rhinopristiformes	22
Acroteriobatus	*ocellatus*	(NORMAN, 1926)	Rhinobatidae	Rhinopristiformes	16
Acroteriobatus	*omanensis*	LAST, HENDERSON & NAYLOR, 2016	Rhinobatidae	Rhinopristiformes	8
Acroteriobatus	*salalah*	RANDALL & COMPAGNO, 1995	Rhinobatidae	Rhinopristiformes	19
Acroteriobatus	*variegatus*	(NAIR & LAL MOHAN, 1973)	Rhinobatidae	Rhinopristiformes	21
Acroteriobatus	*zanzibarensis*	(NORMAN, 1926)	Rhinobatidae	Rhinopristiformes	12
Pseudobatos	*buthi*	RUTLEDGE, 2019	Rhinobatidae	Rhinopristiformes	1
Pseudobatos	*glaucostigmus*	(JORDAN & GILBERT, 1883)	Rhinobatidae	Rhinopristiformes	52
Pseudobatos	*horkelii*	(MÜLLER & HENLE, 1841)	Rhinobatidae	Rhinopristiformes	78
Pseudobatos	*lentiginosus*	(GARMAN, 1880)	Rhinobatidae	Rhinopristiformes	73
Pseudobatos	*leucorhynchus*	(GÜNTHER, 1866)	Rhinobatidae	Rhinopristiformes	69

Pseudobatos	*percellens*	(WALBAUM, 1792)	Rhinobatidae	Rhinopristiformes	103
Pseudobatos	*planiceps*	(GARMAN, 1880)	Rhinobatidae	Rhinopristiformes	51
Pseudobatos	*prahli*	(ACERO & FRANKE, 1995)	Rhinobatidae	Rhinopristiformes	28
Pseudobatos	*productus*	(AYRES, 1854)	Rhinobatidae	Rhinopristiformes	138
Rhinobatos	*albomaculatus*	NORMAN, 1930	Rhinobatidae	Rhinopristiformes	21
Rhinobatos	*annandalei*	NORMAN, 1926	Rhinobatidae	Rhinopristiformes	34
Rhinobatos	*austini*	EBERT & GON, 2017	Rhinobatidae	Rhinopristiformes	3
Rhinobatos	*borneensis*	LAST, SÉRET & NAYLOR, 2016	Rhinobatidae	Rhinopristiformes	7
Rhinobatos	*holcorhynchus*	NORMAN, 1922	Rhinobatidae	Rhinopristiformes	22
Rhinobatos	*hynnicephalus*	RICHARDSON, 1846	Rhinobatidae	Rhinopristiformes	45
Rhinobatos	*irvinei*	NORMAN, 1931	Rhinobatidae	Rhinopristiformes	18
Rhinobatos	*jimbaranensis*	LAST, WHITE & FAHMI, 2006	Rhinobatidae	Rhinopristiformes	10
Rhinobatos	*lionotus*	NORMAN, 1926	Rhinobatidae	Rhinopristiformes	20
Rhinobatos	*manai*	WHITE, LAST & NAYLOR, 2016	Rhinobatidae	Rhinopristiformes	6
Rhinobatos	*nudidorsalis*	LAST, COMPAGNO & NAKAYA, 2004	Rhinobatidae	Rhinopristiformes	8
Rhinobatos	*penggali*	LAST, WHITE & FAHMI, 2006	Rhinobatidae	Rhinopristiformes	10
Rhinobatos	*punctifer*	COMPAGNO & RANDALL, 1987	Rhinobatidae	Rhinopristiformes	38
Rhinobatos	*ranongensis*	LAST, SÉRET & NAYLOR, 2019	Rhinobatidae	Rhinopristiformes	2
Rhinobatos	*rhinobatos*	(LINNAEUS, 1758)	Rhinobatidae	Rhinopristiformes	142
Rhinobatos	*sainsburyi*	LAST, 2004	Rhinobatidae	Rhinopristiformes	11
Rhinobatos	*schlegelii*	(MÜLLER & HENLE, 1841)	Rhinobatidae	Rhinopristiformes	92
Rhinobatos	*whitei*	LAST, CORRIGAN & NAYLOR, 2014	Rhinobatidae	Rhinopristiformes	6
Aptychotrema	*rostrata*	(SHAW, 1794)	Trygonorrhinidae	Rhinopristiformes	112
Aptychotrema	*timorensis*	LAST, 2004	Trygonorrhinidae	Rhinopristiformes	11
Aptychotrema	*vincentiana*	(HAACKE, 1885)	Trygonorrhinidae	Rhinopristiformes	34
Trygonorrhina	*dumerilii*	(CASTELNAU, 1873)	Trygonorrhinidae	Rhinopristiformes	40

Trygonorrhina	*fasciata*	MÜLLER & HENLE, 1841	Trygonorrhinidae	Rhinopristiformes	77
Zapteryx	*brevirostris*	(MÜLLER & HENLE, 1841)	Trygonorrhinidae	Rhinopristiformes	103
Zapteryx	*exasperata*	(JORDAN & GILBERT, 1880)	Trygonorrhinidae	Rhinopristiformes	85
Zapteryx	*xyster*	JORDAN & EVERMANN, 1896	Trygonorrhinidae	Rhinopristiformes	48
Zanobatus	*maculatus*	SÉRET, 2016	Zanobatidae	Rhinopristiformes	5
Zanobatus	*schoenleinii*	(MÜLLER & HENLE, 1841)	Zanobatidae	Rhinopristiformes	59
Anacanthobatis	*marmorata*	(VON BONDE & SWART, 1923)	Anacanthobatidae	Rajiformes	25
Indobatis	*ori*	(WALLACE, 1967)	Anacanthobatidae	Rajiformes	23
Schroederobatis	*americana*	(BIGELOW & SCHROEDER, 1962)	Anacanthobatidae	Rajiformes	30
Sinobatis	*andamanensis*	LAST & BUSSARAWIT, 2016	Anacanthobatidae	Rajiformes	7
Sinobatis	*borneensis*	(CHAN, 1965)	Anacanthobatidae	Rajiformes	47
Sinobatis	*brevicauda*	WEIGMANN & STEHMANN, 2016	Anacanthobatidae	Rajiformes	5
Sinobatis	*bulbicauda*	LAST & SÉRET, 2008	Anacanthobatidae	Rajiformes	10
Sinobatis	*caerulea*	LAST & SÉRET, 2008	Anacanthobatidae	Rajiformes	7
Sinobatis	*filicauda*	LAST & SÉRET, 2008	Anacanthobatidae	Rajiformes	8
Sinobatis	*kotlyari*	STEHMANN & WEIGMANN, 2016	Anacanthobatidae	Rajiformes	4
Sinobatis	*melanosoma*	(CHAN, 1965)	Anacanthobatidae	Rajiformes	17
Sinobatis	*stenosoma*	(LI & HU, 1982)	Anacanthobatidae	Rajiformes	13
Springeria	*folirostris*	BIGELOW & SCHROEDER, 1951	Anacanthobatidae	Rajiformes	22
Springeria	*longirostris*	BIGELOW & SCHROEDER, 1962	Anacanthobatidae	Rajiformes	24
Arhynchobatis	*asperrimus*	WAITE, 1909	Arhynchobatidae	Rajiformes	25
Atlantoraja	*castelnaui*	(MIRANDA RIBEIRO, 1907)	Arhynchobatidae	Rajiformes	99
Atlantoraja	*cyclophora*	(REGAN, 1903)	Arhynchobatidae	Rajiformes	85
Atlantoraja	*platana*	(GÜNTHER, 1880)	Arhynchobatidae	Rajiformes	58
Bathyraja	*abyssicola*	(GILBERT, 1896)	Arhynchobatidae	Rajiformes	55
Bathyraja	*aguja*	(KENDALL & RADCLIFFE, 1912)	Arhynchobatidae	Rajiformes	17

Bathyraja	*albomaculata*	(NORMAN, 1937)	Arhynchobatidae	Rajiformes	67
Bathyraja	*aleutica*	(GILBERT, 1896)	Arhynchobatidae	Rajiformes	76
Bathyraja	*andriashevi*	DOLGANOV, 1983	Arhynchobatidae	Rajiformes	17
Bathyraja	*bergi*	DOLGANOV, 1983	Arhynchobatidae	Rajiformes	26
Bathyraja	*brachyurops*	(FOWLER, 1910)	Arhynchobatidae	Rajiformes	84
Bathyraja	*cousseauae*	DÍAZ DE ASTARLOA & MABRAGAÑA, 2004	Arhynchobatidae	Rajiformes	26
Bathyraja	*diplotaenia*	(ISHIYAMA, 1952)	Arhynchobatidae	Rajiformes	27
Bathyraja	*eatonii*	(GÜNTHER, 1876)	Arhynchobatidae	Rajiformes	41
Bathyraja	*fedorovi*	DOLGANOV, 1983	Arhynchobatidae	Rajiformes	19
Bathyraja	*griseocauda*	(NORMAN, 1937)	Arhynchobatidae	Rajiformes	52
Bathyraja	*hesperafricana*	STEHMANN, 1995	Arhynchobatidae	Rajiformes	15
Bathyraja	*interrupta*	(GILL & TOWNSEND, 1897)	Arhynchobatidae	Rajiformes	63
Bathyraja	*irrasa*	HUREAU & OZOUF-COSTAZ, 1980	Arhynchobatidae	Rajiformes	19
Bathyraja	*ishiharai*	STEHMANN, 2005	Arhynchobatidae	Rajiformes	9
Bathyraja	*isotrachys*	(GÜNTHER, 1877)	Arhynchobatidae	Rajiformes	40
Bathyraja	*kincaidii*	(GARMAN, 1908)	Arhynchobatidae	Rajiformes	42
Bathyraja	*leucomelanos*	IGLÉSIAS & LÉVY-HARTMANN, 2012	Arhynchobatidae	Rajiformes	5
Bathyraja	*lindbergi*	ISHIYAMA & ISHIHARA, 1977	Arhynchobatidae	Rajiformes	27
Bathyraja	*longicauda*	(DE BUEN, 1959)	Arhynchobatidae	Rajiformes	19
Bathyraja	*maccaini*	SPRINGER, 1971	Arhynchobatidae	Rajiformes	27
Bathyraja	*macloviana*	(NORMAN, 1937)	Arhynchobatidae	Rajiformes	65
Bathyraja	*maculata*	ISHIYAMA & ISHIHARA, 1977	Arhynchobatidae	Rajiformes	40
Bathyraja	*magellanica*	(PHILIPPI, 1902)	Arhynchobatidae	Rajiformes	49
Bathyraja	*mariposa*	STEVENSON, ORR, HOFF & McEACHRAN, 2004	Arhynchobatidae	Rajiformes	17
Bathyraja	*matsubarai*	(ISHIYAMA, 1952)	Arhynchobatidae	Rajiformes	42
Bathyraja	*meridionalis*	STEHMANN, 1987	Arhynchobatidae	Rajiformes	18

Bathyraja	*microtrachys*	(OSBURN & NICHOLS, 1916)	Arhynchobatidae	Rajiformes	19
Bathyraja	*minispinosa*	ISHIYAMA & ISHIHARA, 1977	Arhynchobatidae	Rajiformes	45
Bathyraja	*multispinis*	(NORMAN, 1937)	Arhynchobatidae	Rajiformes	51
Bathyraja	*murrayi*	(GÜNTHER, 1880)	Arhynchobatidae	Rajiformes	23
Bathyraja	*notoroensis*	ISHIYAMA & ISHIHARA, 1977	Arhynchobatidae	Rajiformes	12
Bathyraja	*pacifica*	LAST, STEWART & SÉRET, 2016	Arhynchobatidae	Rajiformes	7
Bathyraja	*pallida*	(FORSTER, 1967)	Arhynchobatidae	Rajiformes	29
Bathyraja	*panthera*	ORR, STEVENSON, HOFF, SPIES & MCEACHRAN, 2011	Arhynchobatidae	Rajiformes	8
Bathyraja	*papilionifera*	STEHMANN, 1985	Arhynchobatidae	Rajiformes	20
Bathyraja	*parmifera*	(BEAN, 1881)	Arhynchobatidae	Rajiformes	86
Bathyraja	*peruana*	McEACHRAN & MIYAKE, 1984	Arhynchobatidae	Rajiformes	22
Bathyraja	*richardsoni*	(GARRICK, 1961)	Arhynchobatidae	Rajiformes	58
Bathyraja	*scaphiops*	(NORMAN, 1937)	Arhynchobatidae	Rajiformes	42
Bathyraja	*schroederi*	(KREFFT, 1968)	Arhynchobatidae	Rajiformes	32
Bathyraja	*shuntovi*	DOLGANOV, 1985	Arhynchobatidae	Rajiformes	17
Bathyraja	*simoterus*	(ISHIYAMA, 1967)	Arhynchobatidae	Rajiformes	12
Bathyraja	*smirnovi*	(SOLDATOV & PAVLENKO, 1915)	Arhynchobatidae	Rajiformes	33
Bathyraja	*smithii*	(MÜLLER & HENLE, 1841)	Arhynchobatidae	Rajiformes	44
Bathyraja	*spinicauda*	(JENSEN, 1914)	Arhynchobatidae	Rajiformes	71
Bathyraja	*spinosissima*	(BEEBE & TEE-VAN, 1941)	Arhynchobatidae	Rajiformes	31
Bathyraja	*taranetzi*	(DOLGANOV, 1983)	Arhynchobatidae	Rajiformes	45
Bathyraja	*trachouros*	(ISHIYAMA, 1958)	Arhynchobatidae	Rajiformes	19
Bathyraja	*trachura*	(GILBERT, 1892)	Arhynchobatidae	Rajiformes	63
Bathyraja	*tunae*	STEHMANN, 2005	Arhynchobatidae	Rajiformes	8
Bathyraja	*tzinovskii*	DOLGANOV, 1983	Arhynchobatidae	Rajiformes	18
Bathyraja	*violacea*	(SUVOROV, 1935)	Arhynchobatidae	Rajiformes	38

Brochiraja	*aenigma*	LAST & McEACHRAN, 2006	Arhynchobatidae	Rajiformes	7
Brochiraja	*albilabiata*	LAST & McEACHRAN, 2006	Arhynchobatidae	Rajiformes	12
Brochiraja	*asperula*	(GARRICK & PAUL, 1974)	Arhynchobatidae	Rajiformes	22
Brochiraja	*heuresa*	LAST & SÉRET, 2012	Arhynchobatidae	Rajiformes	8
Brochiraja	*leviveneta*	LAST & McEACHRAN, 2006	Arhynchobatidae	Rajiformes	12
Brochiraja	*microspinifera*	LAST & McEACHRAN, 2006	Arhynchobatidae	Rajiformes	12
Brochiraja	*spinifera*	(GARRICK & PAUL, 1974)	Arhynchobatidae	Rajiformes	19
Brochiraja	*vittacauda*	LAST & SÉRET, 2012	Arhynchobatidae	Rajiformes	8
Insentiraja	*laxipella*	(YEARSLEY & LAST, 1992)	Arhynchobatidae	Rajiformes	12
Insentiraja	*subtilispinosa*	(STEHMANN, 1989)	Arhynchobatidae	Rajiformes	18
Irolita	*waitii*	(MCCULLOCH, 1911)	Arhynchobatidae	Rajiformes	22
Irolita	*westraliensis*	LAST & GLEDHILL, 2008	Arhynchobatidae	Rajiformes	8
Notoraja	*alisae*	SÉRET & LAST, 2012	Arhynchobatidae	Rajiformes	8
Notoraja	*azurea*	McEACHRAN & LAST, 2008	Arhynchobatidae	Rajiformes	9
Notoraja	*fijiensis*	SÉRET & LAST, 2012	Arhynchobatidae	Rajiformes	5
Notoraja	*hirticauda*	LAST & McEACHRAN, 2006	Arhynchobatidae	Rajiformes	7
Notoraja	*inusitata*	SÉRET & LAST, 2012	Arhynchobatidae	Rajiformes	5
Notoraja	*lira*	McEACHRAN & LAST, 2008	Arhynchobatidae	Rajiformes	6
Notoraja	*longiventralis*	SÉRET & LAST, 2012	Arhynchobatidae	Rajiformes	5
Notoraja	*martinezi*	CONCHA, EBERT & LONG, 2016	Arhynchobatidae	Rajiformes	6
Notoraja	*ochroderma*	McEACHRAN & LAST, 1994	Arhynchobatidae	Rajiformes	16
Notoraja	*sapphira*	SÉRET & LAST, 2009	Arhynchobatidae	Rajiformes	11
Notoraja	*sereti*	WHITE, LAST & MANA, 2017	Arhynchobatidae	Rajiformes	4
Notoraja	*sticta*	McEACHRAN & LAST, 2008	Arhynchobatidae	Rajiformes	7
Notoraja	*tobitukai*	(HIYAMA, 1940)	Arhynchobatidae	Rajiformes	28
Pavoraja	*alleni*	McEACHRAN & FECHHELM, 1982	Arhynchobatidae	Rajiformes	14

Pavoraja	*arenaria*	LAST, MALLICK & YEARSLEY, 2008	Arhynchobatidae	Rajiformes	7
Pavoraja	*mosaica*	LAST, MALLICK & YEARSLEY, 2008	Arhynchobatidae	Rajiformes	8
Pavoraja	*nitida*	(GÜNTHER, 1880)	Arhynchobatidae	Rajiformes	32
Pavoraja	*pseudonitida*	LAST, MALLICK & YEARSLEY, 2008	Arhynchobatidae	Rajiformes	8
Pavoraja	*umbrosa*	LAST, MALLICK & YEARSLEY, 2008	Arhynchobatidae	Rajiformes	6
Psammobatis	*bergi*	MARINI, 1932	Arhynchobatidae	Rajiformes	48
Psammobatis	*extenta*	(GARMAN, 1913)	Arhynchobatidae	Rajiformes	67
Psammobatis	*lentiginosa*	McEACHRAN, 1983	Arhynchobatidae	Rajiformes	39
Psammobatis	*normani*	McEACHRAN, 1983	Arhynchobatidae	Rajiformes	36
Psammobatis	*parvacauda*	McEACHRAN, 1983	Arhynchobatidae	Rajiformes	11
Psammobatis	*rudis*	GÜNTHER, 1870	Arhynchobatidae	Rajiformes	51
Psammobatis	*rutrum*	JORDAN, 1891	Arhynchobatidae	Rajiformes	34
Psammobatis	*scobina*	(PHILIPPI, 1857)	Arhynchobatidae	Rajiformes	47
Pseudoraja	*fischeri*	BIGELOW & SCHROEDER, 1954	Arhynchobatidae	Rajiformes	25
Rhinoraja	*kujiensis*	(TANAKA, 1916)	Arhynchobatidae	Rajiformes	24
Rhinoraja	*longicauda*	ISHIYAMA, 1952	Arhynchobatidae	Rajiformes	30
Rhinoraja	*odai*	ISHIYAMA, 1958	Arhynchobatidae	Rajiformes	14
Rioraja	*agassizii*	(MÜLLER & HENLE, 1841)	Arhynchobatidae	Rajiformes	109
Sympterygia	*acuta*	GARMAN, 1877	Arhynchobatidae	Rajiformes	75
Sympterygia	*bonapartii*	MÜLLER & HENLE, 1841	Arhynchobatidae	Rajiformes	112
Sympterygia	*brevicaudata*	(COPE, 1877)	Arhynchobatidae	Rajiformes	53
Sympterygia	*lima*	(POEPPIG, 1835)	Arhynchobatidae	Rajiformes	40
Cruriraja	*andamanica*	(LLOYD, 1909)	Gurgesiellidae	Rajiformes	25
Cruriraja	*atlantis*	BIGELOW & SCHROEDER, 1948	Gurgesiellidae	Rajiformes	13
Cruriraja	*cadenati*	BIGELOW & SCHROEDER, 1962	Gurgesiellidae	Rajiformes	14
Cruriraja	*durbanensis*	(VON BONDE & SWART, 1923)	Gurgesiellidae	Rajiformes	21

Cruriraja	*hulleyi*	ASCHLIMAN, EBERT & COMPAGNO, 2010	Gurgesiellidae	Rajiformes	17
Cruriraja	*parcomaculata*	(VON BONDE & SWART, 1923)	Gurgesiellidae	Rajiformes	49
Cruriraja	*poeyi*	BIGELOW & SCHROEDER, 1948	Gurgesiellidae	Rajiformes	24
Cruriraja	*rugosa*	BIGELOW & SCHROEDER, 1958	Gurgesiellidae	Rajiformes	35
Fenestraja	*atripinna*	(BIGELOW & SCHROEDER, 1950)	Gurgesiellidae	Rajiformes	18
Fenestraja	*cubensis*	(BIGELOW & SCHROEDER, 1950)	Gurgesiellidae	Rajiformes	16
Fenestraja	*ishiyamai*	(BIGELOW & SCHROEDER, 1962)	Gurgesiellidae	Rajiformes	21
Fenestraja	*maceachrani*	(SÉRET, 1989)	Gurgesiellidae	Rajiformes	13
Fenestraja	*mamillidens*	(ALCOCK, 1889)	Gurgesiellidae	Rajiformes	22
Fenestraja	*plutonia*	(GARMAN, 1881)	Gurgesiellidae	Rajiformes	39
Fenestraja	*sibogae*	(WEBER, 1913)	Gurgesiellidae	Rajiformes	14
Fenestraja	*sinusmexicanus*	(BIGELOW & SCHROEDER, 1950)	Gurgesiellidae	Rajiformes	29
Gurgesiella	*atlantica*	(BIGELOW & SCHROEDER, 1962)	Gurgesiellidae	Rajiformes	42
Gurgesiella	*dorsalifera*	McEACHRAN & COMPAGNO, 1980	Gurgesiellidae	Rajiformes	28
Gurgesiella	*furvescens*	DE BUEN, 1959	Gurgesiellidae	Rajiformes	27
Heliotrygon	*gomesi*	CARVALHO & LOVEJOY, 2011	Potamotrygonidae	Myliobatiformes	10
Heliotrygon	*rosai*	CARVALHO & LOVEJOY, 2011	Potamotrygonidae	Myliobatiformes	10
Paratrygon	*aiereba*	(MÜLLER & HENLE, 1841)	Potamotrygonidae	Myliobatiformes	103
Plesiotrygon	*iwamae*	ROSA, CASTELLO & THORSON, 1987	Potamotrygonidae	Myliobatiformes	48
Plesiotrygon	*nana*	CARVALHO & RAGNO, 2011	Potamotrygonidae	Myliobatiformes	8
Potamotrygon	*adamastor*	FONTENELLE & DE CARVALHO, 2017	Potamotrygonidae	Myliobatiformes	3
Potamotrygon	*albimaculata*	DE CARVALHO, 2016	Potamotrygonidae	Myliobatiformes	7
Potamotrygon	*amandae*	LOBODA & DE CARVALHO, 2013	Potamotrygonidae	Myliobatiformes	13
Potamotrygon	*amazona*	FONTENELLE & DE CARVALHO, 2017	Potamotrygonidae	Myliobatiformes	4
Potamotrygon	*boesemani*	ROSA, DE CARVALHO & DE ALMEIDA WANDERLEY, 2008	Potamotrygonidae	Myliobatiformes	11
Potamotrygon	*brachyura*	(GÜNTHER, 1880)	Potamotrygonidae	Myliobatiformes	32

Potamotrygon	*constellata*	(VAILLANT, 1880)	Potamotrygonidae	Myliobatiformes	48
Potamotrygon	*falkneri*	CASTEX & MACIEL, 1963	Potamotrygonidae	Myliobatiformes	93
Potamotrygon	*garmani*	FONTENELLE & DE CARVALHO, 2017	Potamotrygonidae	Myliobatiformes	3
Potamotrygon	*henlei*	(CASTELNAU, 1855)	Potamotrygonidae	Myliobatiformes	40
Potamotrygon	*histrix*	(MÜLLER & HENLE, 1841)	Potamotrygonidae	Myliobatiformes	70
Potamotrygon	*humerosa*	GARMAN, 1913	Potamotrygonidae	Myliobatiformes	22
Potamotrygon	*jabuti*	DE CARVALHO, 2016	Potamotrygonidae	Myliobatiformes	7
Potamotrygon	*leopoldi*	CASTEX & CASTELLO, 1970	Potamotrygonidae	Myliobatiformes	40
Potamotrygon	*limai*	FONTENELLE, DA SILVA & DE CARVALHO, 2014	Potamotrygonidae	Myliobatiformes	6
Potamotrygon	*magdalenae*	(DUMÉRIL, 1865)	Potamotrygonidae	Myliobatiformes	60
Potamotrygon	*marinae*	DEYNAT, 2006	Potamotrygonidae	Myliobatiformes	14
Potamotrygon	*marquesi*	DA SILVA & LOBODA, 2019	Potamotrygonidae	Myliobatiformes	3
Potamotrygon	*motoro*	(MÜLLER & HENLE, 1841)	Potamotrygonidae	Myliobatiformes	204
Potamotrygon	*ocellata*	(ENGELHARDT, 1912)	Potamotrygonidae	Myliobatiformes	18
Potamotrygon	*orbignyi*	(CASTELNAU, 1855)	Potamotrygonidae	Myliobatiformes	115
Potamotrygon	*pantanensis*	LOBODA & DE CARVALHO, 2013	Potamotrygonidae	Myliobatiformes	8
Potamotrygon	*rex*	DE CARVALHO, 2016	Potamotrygonidae	Myliobatiformes	7
Potamotrygon	*schroederi*	FERNÁNDEZ-YÉPEZ, 1958	Potamotrygonidae	Myliobatiformes	48
Potamotrygon	*schuhmacheri*	CASTEX, 1964	Potamotrygonidae	Myliobatiformes	17
Potamotrygon	*scobina*	GARMAN, 1913	Potamotrygonidae	Myliobatiformes	48
Potamotrygon	*signata*	GARMAN, 1913	Potamotrygonidae	Myliobatiformes	22
Potamotrygon	*tatianae*	SILVA & CARVALHO, 2011	Potamotrygonidae	Myliobatiformes	10
Potamotrygon	*tigrina*	CARVALHO, SABAJ PEREZ & LOVEJOY, 2011	Potamotrygonidae	Myliobatiformes	9
Potamotrygon	*wallacei*	DE CARVALHO, ROSA & DE ARAÚJO, 2016	Potamotrygonidae	Myliobatiformes	13
Potamotrygon	*yepezi*	CASTEX & CASTELLO, 1970	Potamotrygonidae	Myliobatiformes	34

Amblyraja	*doellojuradoi*	(POZZI, 1935)	Rajidae	Rajiformes	60
Amblyraja	*frerichsi*	(KREFFT, 1968)	Rajidae	Rajiformes	29
Amblyraja	*georgiana*	(NORMAN, 1938)	Rajidae	Rajiformes	41
Amblyraja	*hyperborea*	(COLLETT, 1879)	Rajidae	Rajiformes	152
Amblyraja	*jenseni*	(BIGELOW & SCHROEDER, 1950)	Rajidae	Rajiformes	43
Amblyraja	*radiata*	(DONOVAN, 1808)	Rajidae	Rajiformes	322
Amblyraja	*reversa*	(LLOYD, 1906)	Rajidae	Rajiformes	19
Amblyraja	*taaf*	(MEISSNER, 1987)	Rajidae	Rajiformes	17
Beringraja	*binoculata*	(GIRARD, 1855)	Rajidae	Rajiformes	132
Beringraja	*cortezensis*	(McEACHRAN & MIYAKE, 1988)	Rajidae	Rajiformes	23
Beringraja	*inornata*	(JORDAN & GILBERT, 1881)	Rajidae	Rajiformes	71
Beringraja	*pulchra*	(LIU, 1932)	Rajidae	Rajiformes	48
Beringraja	*rhina*	(JORDAN & GILBERT, 1880)	Rajidae	Rajiformes	125
Beringraja	*stellulata*	(JORDAN & GILBERT, 1880)	Rajidae	Rajiformes	60
Breviraja	*claramaculata*	McEACHRAN & MATHESON, 1985	Rajidae	Rajiformes	16
Breviraja	*colesi*	BIGELOW & SCHROEDER, 1948	Rajidae	Rajiformes	23
Breviraja	*mouldi*	McEACHRAN & MATHESON, 1995	Rajidae	Rajiformes	13
Breviraja	*nigriventralis*	McEACHRAN & MATHESON, 1985	Rajidae	Rajiformes	23
Breviraja	*spinosa*	BIGELOW & SCHROEDER, 1950	Rajidae	Rajiformes	29
Dactylobatus	*armatus*	BEAN & WEED, 1909	Rajidae	Rajiformes	28
Dactylobatus	*clarkii*	(BIGELOW & SCHROEDER, 1958)	Rajidae	Rajiformes	38
Dentiraja	*australis*	(MACLEAY, 1884)	Rajidae	Rajiformes	26
Dentiraja	*cerva*	(WHITLEY, 1939)	Rajidae	Rajiformes	26
Dentiraja	*confusa*	(LAST, 2008)	Rajidae	Rajiformes	10
Dentiraja	*endeavouri*	(LAST, 2008)	Rajidae	Rajiformes	7
Dentiraja	*falloarga*	(LAST, 2008)	Rajidae	Rajiformes	8

Dentiraja	*flindersi*	LAST & GLEDHILL, 2008	Rajidae	Rajiformes	9
Dentiraja	*healdi*	(LAST, WHITE & POGONOSKI, 2008)	Rajidae	Rajiformes	10
Dentiraja	*lemprieri*	(RICHARDSON, 1845)	Rajidae	Rajiformes	44
Dentiraja	*oculata*	(LAST, 2008)	Rajidae	Rajiformes	7
Dentiraja	*polyommata*	(OGILBY, 1910)	Rajidae	Rajiformes	29
Dipturus	*acrobelus*	LAST, WHITE & POGONOSKI, 2008	Rajidae	Rajiformes	8
Dipturus	*amphispinus*	LAST & ALAVA, 2013	Rajidae	Rajiformes	5
Dipturus	*apricus*	LAST, WHITE & POGONOSKI, 2008	Rajidae	Rajiformes	8
Dipturus	*batis*	(LINNAEUS, 1758)	Rajidae	Rajiformes	310
Dipturus	*bullisi*	(BIGELOW & SCHROEDER, 1962)	Rajidae	Rajiformes	27
Dipturus	*campbelli*	(WALLACE, 1967)	Rajidae	Rajiformes	17
Dipturus	*canutus*	LAST, 2008	Rajidae	Rajiformes	8
Dipturus	*chilensis*	(GUICHENOT, 1848)	Rajidae	Rajiformes	139
Dipturus	*chinensis*	(BASILEWSKY, 1855)	Rajidae	Rajiformes	12
Dipturus	*crosnieri*	(SÉRET, 1989)	Rajidae	Rajiformes	14
Dipturus	*doutrei*	(CADENAT, 1960)	Rajidae	Rajiformes	34
Dipturus	*ecuadoriensis*	(BEEBE & TEE-VAN, 1941)	Rajidae	Rajiformes	10
Dipturus	*garricki*	(BIGELOW & SCHROEDER, 1958)	Rajidae	Rajiformes	26
Dipturus	*gigas*	(ISHIYAMA, 1958)	Rajidae	Rajiformes	23
Dipturus	*grahami*	LAST, 2008	Rajidae	Rajiformes	8
Dipturus	*gudgeri*	(WHITLEY, 1940)	Rajidae	Rajiformes	22
Dipturus	*innominatus*	(GARRICK & PAUL, 1974)	Rajidae	Rajiformes	32
Dipturus	*intermedius*	(PARNELL, 1837)	Rajidae	Rajiformes	18
Dipturus	*johannisdavisi*	(ALCOCK, 1899)	Rajidae	Rajiformes	27
Dipturus	*kwangtungensis*	(CHU, 1960)	Rajidae	Rajiformes	35
Dipturus	*laevis*	(MITCHILL, 1818)	Rajidae	Rajiformes	86

Dipturus	*lamillai*	CONCHA, CAIRA, EBERT & POMPERT, 2019	Rajidae	Rajiformes	1
Dipturus	*lanceorostratus*	(WALLACE, 1967)	Rajidae	Rajiformes	18
Dipturus	*leptocaudus*	(KREFFT & STEHMANN, 1975)	Rajidae	Rajiformes	21
Dipturus	*macrocaudus*	(ISHIYAMA, 1955)	Rajidae	Rajiformes	25
Dipturus	*melanospilus*	LAST, WHITE & POGONOSKI, 2008	Rajidae	Rajiformes	9
Dipturus	*mennii*	GOMES & PARAGÓ, 2001	Rajidae	Rajiformes	20
Dipturus	*nidarosiensis*	(STORM, 1881)	Rajidae	Rajiformes	63
Dipturus	*olseni*	(BIGELOW & SCHROEDER, 1951)	Rajidae	Rajiformes	28
Dipturus	*oregoni*	(BIGELOW & SCHROEDER, 1958)	Rajidae	Rajiformes	15
Dipturus	*oxyrinchus*	(LINNAEUS, 1758)	Rajidae	Rajiformes	249
Dipturus	*pullopunctatus*	(SMITH, 1964)	Rajidae	Rajiformes	35
Dipturus	*queenslandicus*	LAST, WHITE & POGONOSKI, 2008	Rajidae	Rajiformes	8
Dipturus	*springeri*	(WALLACE, 1967)	Rajidae	Rajiformes	26
Dipturus	*stenorhynchus*	(WALLACE, 1967)	Rajidae	Rajiformes	17
Dipturus	*teevani*	(BIGELOW & SCHROEDER, 1951)	Rajidae	Rajiformes	39
Dipturus	*tengu*	(JORDAN & FOWLER, 1903)	Rajidae	Rajiformes	41
Dipturus	*trachydermus*	(KREFFT & STEHMANN, 1975)	Rajidae	Rajiformes	57
Dipturus	*wengi*	SÉRET & LAST, 2008	Rajidae	Rajiformes	8
Dipturus	*wuhanlingi*	JEONG & NAKABO, 2008	Rajidae	Rajiformes	7
Hongeo	*koreana*	(JEONG & NAKABO, 1997)	Rajidae	Rajiformes	15
Leucoraja	*circularis*	(COUCH, 1838)	Rajidae	Rajiformes	151
Leucoraja	*compagnoi*	(STEHMANN, 1995)	Rajidae	Rajiformes	15
Leucoraja	*elaineae*	EBERT & LESLIE, 2019	Rajidae	Rajiformes	1
Leucoraja	*erinacea*	(MITCHILL, 1825)	Rajidae	Rajiformes	420
Leucoraja	*fullonica*	(LINNAEUS, 1758)	Rajidae	Rajiformes	181
Leucoraja	*garmani*	(WHITLEY, 1939)	Rajidae	Rajiformes	65

Leucoraja	*lentiginosa*	(BIGELOW & SCHROEDER, 1951)	Rajidae	Rajiformes	27
Leucoraja	*leucosticta*	(STEHMANN, 1971)	Rajidae	Rajiformes	17
Leucoraja	*melitensis*	(CLARK, 1926)	Rajidae	Rajiformes	48
Leucoraja	*naevus*	(MÜLLER & HENLE, 1841)	Rajidae	Rajiformes	226
Leucoraja	*ocellata*	(MITCHILL, 1815)	Rajidae	Rajiformes	165
Leucoraja	*pristispina*	LAST, STEHMANN & SÉRET, 2008	Rajidae	Rajiformes	7
Leucoraja	*wallacei*	(HULLEY, 1970)	Rajidae	Rajiformes	38
Leucoraja	*yucatanensis*	(BIGELOW & SCHROEDER, 1950)	Rajidae	Rajiformes	22
Malacoraja	*kreffti*	(STEHMANN, 1977)	Rajidae	Rajiformes	20
Malacoraja	*obscura*	DE CARVALHO, GOMES & GADIG, 2005	Rajidae	Rajiformes	11
Malacoraja	*senta*	(GARMAN, 1885)	Rajidae	Rajiformes	79
Malacoraja	*spinacidermis*	(BARNARD, 1923)	Rajidae	Rajiformes	57
Neoraja	*africana*	(STEHMANN & SÉRET, 1983)	Rajidae	Rajiformes	17
Neoraja	*caerulea*	(STEHMANN, 1976)	Rajidae	Rajiformes	27
Neoraja	*carolinensis*	McEACHRAN & STEHMANN, 1984	Rajidae	Rajiformes	14
Neoraja	*iberica*	STEHMANN, SÉRET, COSTA & BARO, 2008	Rajidae	Rajiformes	17
Neoraja	*stehmanni*	(HULLEY, 1972)	Rajidae	Rajiformes	26
Okamejei	*acutispina*	(ISHIYAMA, 1958)	Rajidae	Rajiformes	26
Okamejei	*arafurensis*	LAST & GLEDHILL, 2008	Rajidae	Rajiformes	9
Okamejei	*boesemani*	(ISHIHARA, 1987)	Rajidae	Rajiformes	23
Okamejei	*cairae*	LAST, FAHMI & ISHIHARA, 2010	Rajidae	Rajiformes	10
Okamejei	*heemstrai*	(McEACHRAN & FECHHELM, 1982)	Rajidae	Rajiformes	15
Okamejei	*hollandi*	(JORDAN & RICHARDSON, 1909)	Rajidae	Rajiformes	37
Okamejei	*kenojei*	(MÜLLER & HENLE, 1841)	Rajidae	Rajiformes	152
Okamejei	*leptoura*	LAST & GLEDHILL, 2008	Rajidae	Rajiformes	7

Okamejei	*meerdervoortii*	(BLEEKER, 1860)	Rajidae	Rajiformes	39
Okamejei	*mengae*	JEONG, NAKABO & WU, 2007	Rajidae	Rajiformes	6
Okamejei	*ornata*	WEIGMANN, STEHMANN & THIEL, 2015	Rajidae	Rajiformes	7
Okamejei	*schmidti*	(ISHIYAMA, 1958)	Rajidae	Rajiformes	14
Orbiraja	*jensenae*	(LAST & LIM, 2010)	Rajidae	Rajiformes	10
Orbiraja	*philipi*	(LLOYD, 1906)	Rajidae	Rajiformes	13
Orbiraja	*powelli*	(ALCOCK, 1898)	Rajidae	Rajiformes	30
Raja	*africana*	CAPAPÉ, 1977	Rajidae	Rajiformes	18
Raja	*asterias*	DELAROCHE, 1809	Rajidae	Rajiformes	201
Raja	*brachyura*	LAFONT, 1873	Rajidae	Rajiformes	204
Raja	*clavata*	LINNAEUS, 1758	Rajidae	Rajiformes	721
Raja	*herwigi*	KREFFT, 1965	Rajidae	Rajiformes	19
Raja	*maderensis*	LOWE, 1838	Rajidae	Rajiformes	42
Raja	*microocellata*	MONTAGU, 1818	Rajidae	Rajiformes	138
Raja	*miraletus*	LINNAEUS, 1758	Rajidae	Rajiformes	272
Raja	*montagui*	FOWLER, 1910	Rajidae	Rajiformes	270
Raja	*ocellifera*	REGAN, 1906	Rajidae	Rajiformes	16
Raja	*parva*	LAST & SÉRET, 2016	Rajidae	Rajiformes	6
Raja	*pita*	FRICKE & AL-HASSAN, 1995	Rajidae	Rajiformes	13
Raja	*polystigma*	REGAN, 1923	Rajidae	Rajiformes	87
Raja	*radula*	DELAROCHE, 1809	Rajidae	Rajiformes	123
Raja	*straeleni*	POLL, 1951	Rajidae	Rajiformes	57
Raja	*undulata*	LACEPÈDE, 1802	Rajidae	Rajiformes	186
Rajella	*annandalei*	(WEBER, 1913)	Rajidae	Rajiformes	13
Rajella	*barnardi*	(NORMAN, 1935)	Rajidae	Rajiformes	44
Rajella	*bathyphila*	(HOLT & BYRNE, 1908)	Rajidae	Rajiformes	44

Rajella	*bigelowi*	(STEHMANN, 1978)	Rajidae	Rajiformes	54
Rajella	*caudaspinosa*	(VON BONDE & SWART, 1923)	Rajidae	Rajiformes	36
Rajella	*challengeri*	LAST & STEHMANN, 2008	Rajidae	Rajiformes	6
Rajella	*dissimilis*	(HULLEY, 1970)	Rajidae	Rajiformes	30
Rajella	*eisenhardti*	LONG & McCOSKER, 1999	Rajidae	Rajiformes	11
Rajella	*fuliginea*	(BIGELOW & SCHROEDER, 1954)	Rajidae	Rajiformes	26
Rajella	*fyllae*	(LÜTKEN, 1887)	Rajidae	Rajiformes	95
Rajella	*kukujevi*	(DOLGANOV, 1985)	Rajidae	Rajiformes	26
Rajella	*leoparda*	(VON BONDE & SWART, 1923)	Rajidae	Rajiformes	45
Rajella	*lintea*	(FRIES, 1838)	Rajidae	Rajiformes	75
Rajella	*nigerrima*	(DE BUEN, 1960)	Rajidae	Rajiformes	21
Rajella	*paucispinosa*	WEIGMANN, STEHMANN & THIEL, 2014	Rajidae	Rajiformes	7
Rajella	*purpuriventralis*	(BIGELOW & SCHROEDER, 1962)	Rajidae	Rajiformes	27
Rajella	*ravidula*	(HULLEY, 1970)	Rajidae	Rajiformes	30
Rajella	*sadowskii*	(KREFFT & STEHMANN, 1974)	Rajidae	Rajiformes	32
Rostroraja	*ackleyi*	GARMAN, 1881	Rajidae	Rajiformes	32
Rostroraja	*alba*	(LACÉPÈDE, 1803)	Rajidae	Rajiformes	197
Rostroraja	*bahamensis*	(BIGELOW & SCHROEDER, 1965)	Rajidae	Rajiformes	12
Rostroraja	*cervigoni*	(BIGELOW & SCHROEDER, 1964)	Rajidae	Rajiformes	24
Rostroraja	*eglanteria*	(LACEPÈDE (ex BOSC), 1800)	Rajidae	Rajiformes	214
Rostroraja	*equatorialis*	(JORDAN & BOLLMAN, 1890)	Rajidae	Rajiformes	40
Rostroraja	*texana*	(CHANDLER, 1921)	Rajidae	Rajiformes	37
Rostroraja	*velezi*	(CHIRICHIGNO, 1973)	Rajidae	Rajiformes	58
Spiniraja	*whitleyi*	(IREDALE, 1938)	Rajidae	Rajiformes	44
Zearaja	*argentinensis*	(DÍAZ DE ASTARLOA, MABRAGAÑA, HANNER & FIGUEROA, 2008)	Rajidae	Rajiformes	10

Zearaja	*brevicaudata*	(MARINI, 1933)	Rajidae	Rajiformes	5
Zearaja	*maugeana*	LAST & GLEDHILL, 2007	Rajidae	Rajiformes	14
Zearaja	*nasuta*	(MÜLLER & HENLE, 1841)	Rajidae	Rajiformes	60
Aetobatus	*flagellum*	(BLOCH & SCHNEIDER, 1801)	Aetobatidae	Myliobatiformes	73
Aetobatus	*laticeps*	(GILL, 1865)	Aetobatidae	Myliobatiformes	21
Aetobatus	*narinari*	(EUPHRASEN, 1790)	Aetobatidae	Myliobatiformes	481
Aetobatus	*narutobiei*	WHITE, FURUMITSU & YAMAGUCHI, 2013	Aetobatidae	Myliobatiformes	8
Aetobatus	*ocellatus*	(KUHL, 1823)	Aetobatidae	Myliobatiformes	116
Bathytoshia	*brevicaudata*	(HUTTON, 1875)	Dasyatidae	Myliobatiformes	147
Bathytoshia	*centroura*	(MITCHILL, 1815)	Dasyatidae	Myliobatiformes	235
Bathytoshia	*lata*	(GARMAN, 1880)	Dasyatidae	Myliobatiformes	135
Brevitrygon	*heterura*	(BLEEKER, 1852)	Dasyatidae	Myliobatiformes	9
Brevitrygon	*imbricata*	(BLOCH & SCHNEIDER, 1801)	Dasyatidae	Myliobatiformes	100
Brevitrygon	*javaensis*	(LAST & WHITE, 2013)	Dasyatidae	Myliobatiformes	6
Brevitrygon	*walga*	(MÜLLER & HENLE, 1841)	Dasyatidae	Myliobatiformes	85
Dasyatis	*chrysonota*	(SMITH, 1828)	Dasyatidae	Myliobatiformes	38
Dasyatis	*gigantea*	(LINDBERG, 1930)	Dasyatidae	Myliobatiformes	11
Dasyatis	*hastata*	(DEKAY, 1842)	Dasyatidae	Myliobatiformes	35
Dasyatis	*hypostigma*	SANTOS & CARVALHO, 2004	Dasyatidae	Myliobatiformes	38
Dasyatis	*marmorata*	(STEINDACHNER, 1892)	Dasyatidae	Myliobatiformes	54
Dasyatis	*pastinaca*	(LINNAEUS, 1758)	Dasyatidae	Myliobatiformes	367
Dasyatis	*tortonesei*	CAPAPÉ, 1975	Dasyatidae	Myliobatiformes	37
Fluvitrygon	*kittipongi*	(VIDTHAYANON & ROBERTS, 2005)	Dasyatidae	Myliobatiformes	19
Fluvitrygon	*oxyrhynchus*	(SAUVAGE, 1878)	Dasyatidae	Myliobatiformes	51
Fluvitrygon	*signifer*	(COMPAGNO & ROBERTS, 1982)	Dasyatidae	Myliobatiformes	57
Fontitrygon	*colarensis*	(SANTOS, GOMES & CHARVET-ALMEIDA, 2004)	Dasyatidae	Myliobatiformes	13

Fontitrygon	*garouaensis*	(STAUCH & BLANC, 1962)	Dasyatidae	Myliobatiformes	28
Fontitrygon	*geijskesi*	(BOESEMAN, 1948)	Dasyatidae	Myliobatiformes	31
Fontitrygon	*margarita*	(GÜNTHER, 1870)	Dasyatidae	Myliobatiformes	50
Fontitrygon	*margaritella*	(COMPAGNO & ROBERTS, 1984)	Dasyatidae	Myliobatiformes	31
Fontitrygon	*ukpam*	(SMITH, 1863)	Dasyatidae	Myliobatiformes	26
Hemitrygon	*akajei*	(MÜLLER & HENLE, 1841)	Dasyatidae	Myliobatiformes	170
Hemitrygon	*bennettii*	(MÜLLER & HENLE, 1841)	Dasyatidae	Myliobatiformes	62
Hemitrygon	*fluviorum*	(OGILBY, 1908)	Dasyatidae	Myliobatiformes	75
Hemitrygon	*izuensis*	(NISHIDA & NAKAYA, 1988)	Dasyatidae	Myliobatiformes	18
Hemitrygon	*laevigata*	CHU, 1960	Dasyatidae	Myliobatiformes	14
Hemitrygon	*laosensis*	(ROBERTS & KARNASUTA, 1987)	Dasyatidae	Myliobatiformes	26
Hemitrygon	*longicauda*	(LAST & WHITE, 2013)	Dasyatidae	Myliobatiformes	9
Hemitrygon	*navarrae*	(STEINDACHNER, 1892)	Dasyatidae	Myliobatiformes	20
Hemitrygon	*parvonigra*	(LAST & WHITE, 2008)	Dasyatidae	Myliobatiformes	14
Hemitrygon	*sinensis*	(STEINDACHNER, 1892)	Dasyatidae	Myliobatiformes	13
Himantura	*australis*	LAST, WHITE & NAYLOR, 2016	Dasyatidae	Myliobatiformes	17
Himantura	*leoparda*	MANJAJI-MATSUMOTO & LAST, 2008	Dasyatidae	Myliobatiformes	46
Himantura	*uarnak*	(FORSSKÅL, 1775)	Dasyatidae	Myliobatiformes	274
Himantura	*undulata*	(BLEEKER, 1852)	Dasyatidae	Myliobatiformes	74
Hypanus	*americanus*	(HILDEBRAND & SCHROEDER, 1928)	Dasyatidae	Myliobatiformes	225
Hypanus	*dipterurus*	(JORDAN & GILBERT, 1880)	Dasyatidae	Myliobatiformes	124
Hypanus	*guttatus*	(BLOCH & SCHNEIDER, 1801)	Dasyatidae	Myliobatiformes	132
Hypanus	*longus*	(GARMAN, 1880)	Dasyatidae	Myliobatiformes	100
Hypanus	*marianae*	(GOMES, ROSA & GADIG, 2000)	Dasyatidae	Myliobatiformes	29
Hypanus	*rudis*	(GÜNTHER, 1870)	Dasyatidae	Myliobatiformes	17
Hypanus	*sabinus*	(LESUEUR, 1824)	Dasyatidae	Myliobatiformes	246

Hypanus	*say*	(LESUEUR, 1817)	Dasyatidae	Myliobatiformes	126
Maculabatis	*ambigua*	LAST, BOGORODSKY & ALPERMANN, 2016	Dasyatidae	Myliobatiformes	8
Maculabatis	*arabica*	MANJAJI-MATSUMOTO & LAST, 2016	Dasyatidae	Myliobatiformes	7
Maculabatis	*astra*	(LAST, MANJAJI-MATSUMOTO & POGONOSKI, 2008)	Dasyatidae	Myliobatiformes	28
Maculabatis	*bineeshi*	MANJAJI-MATSUMOTO & LAST, 2016	Dasyatidae	Myliobatiformes	6
Maculabatis	*gerrardi*	(GRAY, 1851)	Dasyatidae	Myliobatiformes	152
Maculabatis	*macrura*	(BLEEKER, 1852)	Dasyatidae	Myliobatiformes	7
Maculabatis	*pastinacoides*	(BLEEKER, 1852)	Dasyatidae	Myliobatiformes	44
Maculabatis	*randalli*	(LAST, MANJAJI-MATSUMOTO & MOORE, 2012)	Dasyatidae	Myliobatiformes	14
Maculabatis	*toshi*	(WHITLEY, 1939)	Dasyatidae	Myliobatiformes	43
Makararaja	*chindwinensis*	ROBERTS, 2007	Dasyatidae	Myliobatiformes	8
Megatrygon	*microps*	(ANNANDALE, 1908)	Dasyatidae	Myliobatiformes	58
Neotrygon	*annotata*	(LAST, 1987)	Dasyatidae	Myliobatiformes	35
Neotrygon	*australiae*	LAST, WHITE & SÉRET, 2016	Dasyatidae	Myliobatiformes	11
Neotrygon	*bobwardi*	BORSA, ARLYZA, HOAREAU & SHEN, 2017	Dasyatidae	Myliobatiformes	1
Neotrygon	*caeruleopunctata*	LAST, WHITE & SÉRET, 2016	Dasyatidae	Myliobatiformes	15
Neotrygon	*indica*	PAVAN-KUMAR, KUMAR, PITALE, SHEN & BORSA, 2018	Dasyatidae	Myliobatiformes	6
Neotrygon	*kuhlii*	(MÜLLER & HENLE, 1841)	Dasyatidae	Myliobatiformes	257
Neotrygon	*leylandi*	(LAST, 1987)	Dasyatidae	Myliobatiformes	31
Neotrygon	*malaccensis*	BORSA, ARLYZA, HOAREAU & SHEN, 2017	Dasyatidae	Myliobatiformes	1
Neotrygon	*moluccensis*	BORSA, ARLYZA, HOAREAU & SHEN, 2017	Dasyatidae	Myliobatiformes	1
Neotrygon	*ningalooensis*	LAST, WHITE, & PUCKRIDGE, 2010	Dasyatidae	Myliobatiformes	10
Neotrygon	*orientale*	LAST, WHITE & SÉRET, 2016	Dasyatidae	Myliobatiformes	11

Neotrygon	*picta*	LAST & WHITE, 2008	Dasyatidae	Myliobatiformes	22
Neotrygon	*trigonoides*	(CASTELNAU, 1873)	Dasyatidae	Myliobatiformes	13
Neotrygon	*vali*	BORSA, 2017	Dasyatidae	Myliobatiformes	2
Neotrygon	*varidens*	(GARMAN, 1885)	Dasyatidae	Myliobatiformes	10
Neotrygon	*westpapuensis*	BORSA, ARLYZA, HOAREAU & SHEN, 2017	Dasyatidae	Myliobatiformes	3
Pastinachus	*ater*	(MACLEAY, 1883)	Dasyatidae	Myliobatiformes	68
Pastinachus	*gracilicaudus*	LAST & MANJAJI-MATSUMOTO, 2010	Dasyatidae	Myliobatiformes	15
Pastinachus	*sephen*	(FORSSKÅL, 1775)	Dasyatidae	Myliobatiformes	275
Pastinachus	*solocirostris*	LAST, MANJAJI & YEARSLEY, 2005	Dasyatidae	Myliobatiformes	23
Pastinachus	*stellurostris*	LAST, FAHMI & NAYLOR, 2010	Dasyatidae	Myliobatiformes	11
Pateobatis	*bleekeri*	(BLYTH, 1860)	Dasyatidae	Myliobatiformes	55
Pateobatis	*fai*	(JORDAN & SEALE, 1906)	Dasyatidae	Myliobatiformes	123
Pateobatis	*hortlei*	(LAST, MANJAJI-MATSUMOTO & KAILOLA, 2006)	Dasyatidae	Myliobatiformes	17
Pateobatis	*jenkinsii*	(ANNANDALE, 1909)	Dasyatidae	Myliobatiformes	91
Pateobatis	*uarnacoides*	(BLEEKER, 1852)	Dasyatidae	Myliobatiformes	71
Pteroplatytrygon	*violacea*	(BONAPARTE, 1832)	Dasyatidae	Myliobatiformes	305
Taeniura	*lessoni*	LAST, WHITE & NAYLOR, 2016	Dasyatidae	Myliobatiformes	8
Taeniura	*lymma*	(FORSSKÅL, 1775)	Dasyatidae	Myliobatiformes	231
Taeniurops	*grabatus*	(GEOFFROY SAINT-HILAIRE, 1817)	Dasyatidae	Myliobatiformes	76
Taeniurops	*meyeni*	(MÜLLER & HENLE, 1841)	Dasyatidae	Myliobatiformes	170
Telatrygon	*acutirostra*	(NISHIDA & NAKAYA, 1988)	Dasyatidae	Myliobatiformes	29
Telatrygon	*biasa*	LAST, WHITE & NAYLOR, 2016	Dasyatidae	Myliobatiformes	9
Telatrygon	*crozieri*	(BLYTH, 1860)	Dasyatidae	Myliobatiformes	4
Telatrygon	*zugei*	(MÜLLER & HENLE, 1841)	Dasyatidae	Myliobatiformes	123
Urogymnus	*acanthobothrium*	LAST, WHITE & KYNE, 2016	Dasyatidae	Myliobatiformes	8
Urogymnus	*asperrimus*	(BLOCH & SCHNEIDER, 1801)	Dasyatidae	Myliobatiformes	153

Urogymnus	*dalyensis*	(LAST & MANJAJI-MATSUMOTO, 2008)	Dasyatidae	Myliobatiformes	22
Urogymnus	*granulatus*	(MACLEAY, 1883)	Dasyatidae	Myliobatiformes	97
Urogymnus	*lobistoma*	(MANJAJI-MATSUMOTO & LAST, 2006)	Dasyatidae	Myliobatiformes	18
Urogymnus	*polylepis*	(BLEEKER, 1852)	Dasyatidae	Myliobatiformes	61
Gymnura	*altavela*	(LINNAEUS, 1758)	Gymnuridae	Myliobatiformes	223
Gymnura	*australis*	(RAMSAY & OGILBY, 1886)	Gymnuridae	Myliobatiformes	47
Gymnura	*crebripunctata*	(PETERS, 1869)	Gymnuridae	Myliobatiformes	37
Gymnura	*japonica*	(TEMMINCK & SCHLEGEL, 1850)	Gymnuridae	Myliobatiformes	74
Gymnura	*lessae*	YOKOTA & DE CARVALHO, 2017	Gymnuridae	Myliobatiformes	3
Gymnura	*marmorata*	(COOPER, 1864)	Gymnuridae	Myliobatiformes	91
Gymnura	*micrura*	(BLOCH & SCHNEIDER, 1801)	Gymnuridae	Myliobatiformes	172
Gymnura	*natalensis*	(GILCHRIST & THOMPSON, 1911)	Gymnuridae	Myliobatiformes	34
Gymnura	*poecilura*	(SHAW, 1804)	Gymnuridae	Myliobatiformes	104
Gymnura	*sereti*	YOKOTA & DE CARVALHO, 2017	Gymnuridae	Myliobatiformes	3
Gymnura	*tentaculata*	(MÜLLER & HENLE, 1841)	Gymnuridae	Myliobatiformes	28
Gymnura	*zonura*	(BLEEKER, 1852)	Gymnuridae	Myliobatiformes	46
Hexatrygon	*bickelli*	HEEMSTRA & SMITH, 1980	Hexatrygonidae	Myliobatiformes	57
Mobula	*alfredi*	(KREFFT, 1868)	Mobulidae	Myliobatiformes	142
Mobula	*birostris*	(WALBAUM, 1792)	Mobulidae	Myliobatiformes	416
Mobula	*eregoodoo*	(CANTOR, 1849)	Mobulidae	Myliobatiformes	126
Mobula	*hypostoma*	(BANCROFT, 1831)	Mobulidae	Myliobatiformes	139
Mobula	*kuhlii*	(MÜLLER & HENLE, 1841)	Mobulidae	Myliobatiformes	98
Mobula	*mobular*	(BONNATERRE, 1788)	Mobulidae	Myliobatiformes	356
Mobula	*munkiana*	NOTARBARTOLO DI SCIARA, 1987	Mobulidae	Myliobatiformes	59
Mobula	*tarapacana*	(PHILIPPI, 1892)	Mobulidae	Myliobatiformes	154
Mobula	*thurstoni*	(LLOYD, 1908)	Mobulidae	Myliobatiformes	151

Aetomylaeus	*asperrimus*	(GILBERT, 1898)	Myliobatidae	Myliobatiformes	22
Aetomylaeus	*bovinus*	(GEOFFROY SAINT-HILAIRE, 1817)	Myliobatidae	Myliobatiformes	157
Aetomylaeus	*caeruleofasciatus*	WHITE, LAST & BAJE, 2015	Myliobatidae	Myliobatiformes	9
Aetomylaeus	*maculatus*	(GRAY, 1834)	Myliobatidae	Myliobatiformes	78
Aetomylaeus	*milvus*	(MÜLLER & HENLE, 1841)	Myliobatidae	Myliobatiformes	47
Aetomylaeus	*nichofii*	(BLOCH & SCHNEIDER, 1801)	Myliobatidae	Myliobatiformes	134
Aetomylaeus	*vespertilio*	(BLEEKER, 1852)	Myliobatidae	Myliobatiformes	69
Myliobatis	*aquila*	(LINNAEUS, 1758)	Myliobatidae	Myliobatiformes	291
Myliobatis	*californica*	GILL, 1865	Myliobatidae	Myliobatiformes	158
Myliobatis	*chilensis*	PHILIPPI, 1892	Myliobatidae	Myliobatiformes	28
Myliobatis	*freminvillei*	LESUEUR, 1824	Myliobatidae	Myliobatiformes	111
Myliobatis	*goodei*	GARMAN, 1885	Myliobatidae	Myliobatiformes	91
Myliobatis	*hamlyni*	OGILBY, 1911	Myliobatidae	Myliobatiformes	25
Myliobatis	*longirostris*	APPLEGATE & FITCH, 1964	Myliobatidae	Myliobatiformes	38
Myliobatis	*peruvianus*	GARMAN, 1913	Myliobatidae	Myliobatiformes	23
Myliobatis	*ridens*	RUOCCO, LUCIFORA, DE ASTARLOA, MABRAGAÑA & DELPIANI, 2012	Myliobatidae	Myliobatiformes	17
Myliobatis	*tenuicaudatus*	HECTOR, 1877	Myliobatidae	Myliobatiformes	98
Myliobatis	*tobijei*	BLEEKER, 1854	Myliobatidae	Myliobatiformes	66
Plesiobatis	*daviesi*	(WALLACE, 1967)	Plesiobatididae	Myliobatiformes	82
Styracura	*pacifica*	(BEEBE & TEE-VAN, 1941)	Potamotrygonidae	Myliobatiformes	38
Styracura	*schmardae*	(WERNER, 1904)	Potamotrygonidae	Myliobatiformes	70
Rhinoptera	*bonasus*	(MITCHILL, 1815)	Rhinopteridae	Myliobatiformes	285
Rhinoptera	*brasiliensis*	MÜLLER, 1836	Rhinopteridae	Myliobatiformes	62
Rhinoptera	*javanica*	MÜLLER & HENLE, 1841	Rhinopteridae	Myliobatiformes	144
Rhinoptera	*jayakari*	BOULENGER, 1895	Rhinopteridae	Myliobatiformes	46

Rhinoptera	*marginata*	(GEOFFROY SAINT-HILAIRE, 1817)	Rhinopteridae	Myliobatiformes	70
Rhinoptera	*neglecta*	OGILBY, 1912	Rhinopteridae	Myliobatiformes	41
Rhinoptera	*peli*	BLEEKER, 1863	Rhinopteridae	Myliobatiformes	12
Rhinoptera	*steindachneri*	EVERMANN & JENKINS, 1891	Rhinopteridae	Myliobatiformes	86
Spinilophus	*armatus*	(MÜLLER & HENLE, 1841)	Urolophidae	Myliobatiformes	27
Trygonoptera	*galba*	LAST & YEARSLEY, 2008	Urolophidae	Myliobatiformes	7
Trygonoptera	*imitata*	YEARSLEY, LAST & GOMON, 2008	Urolophidae	Myliobatiformes	12
Trygonoptera	*mucosa*	(WHITLEY, 1939)	Urolophidae	Myliobatiformes	23
Trygonoptera	*ovalis*	LAST & GOMON, 1987	Urolophidae	Myliobatiformes	16
Trygonoptera	*personata*	LAST & GOMON, 1987	Urolophidae	Myliobatiformes	21
Trygonoptera	*testacea*	MÜLLER & HENLE, 1841	Urolophidae	Myliobatiformes	65
Urolophus	*aurantiacus*	MÜLLER & HENLE, 1841	Urolophidae	Myliobatiformes	47
Urolophus	*bucculentus*	MACLEAY, 1884	Urolophidae	Myliobatiformes	37
Urolophus	*circularis*	McKAY, 1966	Urolophidae	Myliobatiformes	13
Urolophus	*cruciatus*	(LACEPÈDE, 1804)	Urolophidae	Myliobatiformes	56
Urolophus	*deforgesi*	SÉRET & LAST, 2003	Urolophidae	Myliobatiformes	10
Urolophus	*expansus*	MCCULLOCH, 1916	Urolophidae	Myliobatiformes	26
Urolophus	*flavomosaicus*	LAST & GOMON, 1987	Urolophidae	Myliobatiformes	17
Urolophus	*gigas*	SCOTT, 1954	Urolophidae	Myliobatiformes	17
Urolophus	*javanicus*	(MARTENS, 1864)	Urolophidae	Myliobatiformes	14
Urolophus	*kaianus*	GÜNTHER, 1880	Urolophidae	Myliobatiformes	12
Urolophus	*kapalensis*	YEARSLEY & LAST, 2006	Urolophidae	Myliobatiformes	12
Urolophus	*lobatus*	MCKAY, 1966	Urolophidae	Myliobatiformes	22
Urolophus	*mitosis*	LAST & GOMON, 1987	Urolophidae	Myliobatiformes	12
Urolophus	*neocaledoniensis*	SÉRET & LAST, 2003	Urolophidae	Myliobatiformes	10
Urolophus	*orarius*	LAST & GOMON, 1987	Urolophidae	Myliobatiformes	12

Urolophus	*papilio*	SÉRET & LAST, 2003	Urolophidae	Myliobatiformes	8
Urolophus	*paucimaculatus*	DIXON, 1969	Urolophidae	Myliobatiformes	47
Urolophus	*piperatus*	SÉRET & LAST, 2003	Urolophidae	Myliobatiformes	14
Urolophus	*sufflavus*	WHITLEY, 1929	Urolophidae	Myliobatiformes	19
Urolophus	*viridis*	MCCULLOCH, 1916	Urolophidae	Myliobatiformes	27
Urolophus	*westraliensis*	LAST & GOMON, 1987	Urolophidae	Myliobatiformes	16
Urobatis	*concentricus*	OSBURN & NICHOLS, 1916	Urotrygonidae	Myliobatiformes	35
Urobatis	*halleri*	(COOPER, 1863)	Urotrygonidae	Myliobatiformes	199
Urobatis	*jamaicensis*	(CUVIER, 1816)	Urotrygonidae	Myliobatiformes	142
Urobatis	*maculatus*	GARMAN, 1913	Urotrygonidae	Myliobatiformes	36
Urobatis	*marmoratus*	(PHILIPPI, 1892)	Urotrygonidae	Myliobatiformes	12
Urobatis	*pardalis*	DEL MORAL-FLORES, ANGULO, LÓPEZ & BUSSING, 2015	Urotrygonidae	Myliobatiformes	6
Urobatis	*tumbesensis*	(CHIRICHIGNO & McEACHRAN, 1979)	Urotrygonidae	Myliobatiformes	25
Urotrygon	*aspidura*	(JORDAN & GILBERT, 1882)	Urotrygonidae	Myliobatiformes	62
Urotrygon	*chilensis*	(GÜNTHER, 1872)	Urotrygonidae	Myliobatiformes	76
Urotrygon	*cimar*	LÓPEZ & BUSSING, 1998	Urotrygonidae	Myliobatiformes	17
Urotrygon	*microphthalmum*	DELSMAN, 1941	Urotrygonidae	Myliobatiformes	38
Urotrygon	*munda*	GILL, 1863	Urotrygonidae	Myliobatiformes	78
Urotrygon	*nana*	MIYAKE & McEACHRAN, 1988	Urotrygonidae	Myliobatiformes	34
Urotrygon	*reticulata*	MIYAKE & McEACHRAN, 1988	Urotrygonidae	Myliobatiformes	17
Urotrygon	*rogersi*	(JORDAN & STARKS, 1895)	Urotrygonidae	Myliobatiformes	75
Urotrygon	*simulatrix*	MIYAKE & McEACHRAN, 1988	Urotrygonidae	Myliobatiformes	19
Urotrygon	*venezuelae*	SCHULTZ, 1949	Urotrygonidae	Myliobatiformes	37

3.3.3.4 "Top 20" most studied ray and skate species

Genus	Species	Author	Family	Order	No of records
Raja	*clavata*	LINNAEUS, 1758	Rajidae	Rajiformes	721
Aetobatus	*narinari*	(EUPHRASEN, 1790)	Aetobatidae	Myliobatiformes	481
Pristis	*pristis*	(LINNAEUS, 1758)	Pristidae	Rhinopristiformes	479
Leucoraja	*erinacea*	(MITCHILL, 1825)	Rajidae	Rajiformes	420
Mobula	*birostris*	(WALBAUM, 1792)	Mobulidae	Myliobatiformes	416
Torpedo	*marmorata*	RISSO, 1810	Torpedinidae	Torpediniformes	387
Dasyatis	*pastinaca*	(LINNAEUS, 1758)	Dasyatidae	Myliobatiformes	367
Mobula	*mobular*	(BONNATERRE, 1788)	Mobulidae	Myliobatiformes	356
Amblyraja	*radiata*	(DONOVAN, 1808)	Rajidae	Rajiformes	322
Dipturus	*batis*	(LINNAEUS, 1758)	Rajidae	Rajiformes	310
Pteroplatytrygon	*violacea*	(BONAPARTE, 1832)	Dasyatidae	Myliobatiformes	305
Pristis	*pectinata*	LATHAM, 1794	Pristidae	Rhinopristiformes	304
Myliobatis	*aquila*	(LINNAEUS, 1758)	Myliobatidae	Myliobatiformes	291
Rhinoptera	*bonasus*	(MITCHILL, 1815)	Rhinopteridae	Myliobatiformes	285
Pastinachus	*sephen*	(FORSSKÅL, 1775)	Dasyatidae	Myliobatiformes	275
Himantura	*uarnak*	(FORSSKÅL, 1775)	Dasyatidae	Myliobatiformes	274
Raja	*miraletus*	LINNAEUS, 1758	Rajidae	Rajiformes	272
Raja	*montagui*	FOWLER, 1910	Rajidae	Rajiformes	270
Tetronarce	*nobiliana*	(BONAPARTE, 1835)	Torpedinidae	Torpediniformes	258
Neotrygon	*kuhlii*	(MÜLLER & HENLE, 1841)	Dasyatidae	Myliobatiformes	257

Order/Family	Number of Species	Number of Records
Myliobatiformes	**198**	**13485**
Aetobatidae	5	699
Dasyatidae	97	6301
Gymnuridae	12	862
Hexatrygonidae	1	57
Mobulidae	9	1641
Myliobatidae	18	1462
Plesiobatididae	1	82
Potamotrygonidae	38	1316
Rhinopteridae	8	746
Urolophidae	28	619
Urotrygonidae	17	908
Rajiformes	**332**	**14058**
Anacanthobatidae	14	242
Arhynchobatidae	106	3291
Gurgesiellidae	19	467
Rajidae	157	8850
Rhinopristiformes	**71**	**4504**
Glaucostegidae	6	611
Platyrhinidae	5	183
Pristidae	5	1229
Rhinidae	10	621
Rhinobatidae	35	1286
Trygonorrhinidae	8	510
Zanobatidae	2	64
Torpediniformes	**61**	**2815**
Hypnidae	1	54
Narcinidae	32	990
Narkidae	9	342
Torpedinidae	19	1429
Total:	**662**	**34862**

3.3.3.5 Complete list of taxonomically valid chimaeriform species

Genus	Species	Author	Family	No of records
Callorhinchus	*callorynchus*	(LINNAEUS, 1758)	Callorhinchidae	121
Callorhinchus	*capensis*	DUMÉRIL, 1865	Callorhinchidae	50
Callorhinchus	*milii*	BORY DE SAINT-VINCENT, 1823	Callorhinchidae	173
Chimaera	*argiloba*	LAST, WHITE & POGONOSKI, 2008	Chimaeridae	4
Chimaera	*bahamaensis*	KEMPER, EBERT, DIDIER & COMPAGNO, 2010	Chimaeridae	4
Chimaera	*buccanigella*	CLERKIN, EBERT & KEMPER, 2017	Chimaeridae	1
Chimaera	*carophila*	KEMPER, EBERT, NAYLOR & DIDIER, 2015	Chimaeridae	8
Chimaera	*cubana*	HOWELL RIVERO, 1936	Chimaeridae	19
Chimaera	*didierae*	CLERKIN, EBERT & KEMPER, 2017	Chimaeridae	1
Chimaera	*fulva*	DIDIER, LAST & WHITE, 2008	Chimaeridae	8
Chimaera	*jordani*	TANAKA, 1905	Chimaeridae	10
Chimaera	*lignaria*	DIDIER, 2002	Chimaeridae	22
Chimaera	*macrospina*	DIDIER, LAST & WHITE, 2008	Chimaeridae	6
Chimaera	*monstrosa*	LINNAEUS, 1758	Chimaeridae	313
Chimaera	*notafricana*	KEMPER, EBERT, COMPAGNO & DIDIER, 2010	Chimaeridae	9
Chimaera	*obscura*	DIDIER, LAST & WHITE, 2008	Chimaeridae	4
Chimaera	*ogilbyi*	WAITE, 1898	Chimaeridae	60
Chimaera	*opalescens*	LUCHETTI, IGLÉSIAS & SELLOS, 2011	Chimaeridae	12
Chimaera	*orientalis*	ANGULO, LÓPEZ, BUSSING & MURASE, 2014	Chimaeridae	6
Chimaera	*owstoni*	TANAKA, 1905	Chimaeridae	10
Chimaera	*panthera*	DIDIER, 1998	Chimaeridae	11
Chimaera	*phantasma*	JORDAN & SNYDER, 1900	Chimaeridae	60
Chimaera	*willwatchi*	CLERKIN, EBERT & KEMPER, 2017	Chimaeridae	1

Hydrolagus	*affinis*	(DE BRITO CAPELLO, 1868)	Chimaeridae	84
Hydrolagus	*africanus*	(GILCHRIST, 1922)	Chimaeridae	28
Hydrolagus	*alberti*	BIGELOW & SCHROEDER, 1951	Chimaeridae	28
Hydrolagus	*alphus*	QUARANTA, DIDIER, LONG & EBERT, 2006	Chimaeridae	5
Hydrolagus	*barbouri*	(GARMAN, 1908)	Chimaeridae	27
Hydrolagus	*bemisi*	DIDIER, 2002	Chimaeridae	21
Hydrolagus	*colliei*	(LAY & BENNETT, 1839)	Chimaeridae	189
Hydrolagus	*deani*	(SMITH & RADCLIFFE, 1912)	Chimaeridae	3
Hydrolagus	*eidolon*	(JORDAN & HUBBS, 1925)	Chimaeridae	3
Hydrolagus	*erithacus*	WALOVICH, EBERT & KEMPER, 2017	Chimaeridae	1
Hydrolagus	*homonycteris*	DIDIER, 2008	Chimaeridae	12
Hydrolagus	*lusitanicus*	MOURA, FIGUEIREDO, BORDALO-MACHADO, ALMEIDA & GORDO, 2005	Chimaeridae	10
Hydrolagus	*macrophthalmus*	DE BUEN, 1959	Chimaeridae	21
Hydrolagus	*marmoratus*	DIDIER, 2008	Chimaeridae	5
Hydrolagus	*matallanasi*	SOTO & VOOREN, 2004	Chimaeridae	7
Hydrolagus	*mccoskeri*	BARNETT, DIDIER, LONG & EBERT, 2006	Chimaeridae	5
Hydrolagus	*melanophasma*	JAMES & EBERT & LONG & DIDIER, 2009	Chimaeridae	16
Hydrolagus	*mirabilis*	(COLLETT, 1904)	Chimaeridae	48
Hydrolagus	*mitsukurii*	(JORDAN & SNYDER, 1904)	Chimaeridae	28
Hydrolagus	*novaezealandiae*	(FOWLER, 1911)	Chimaeridae	38
Hydrolagus	*pallidus*	HARDY & STEHMANN, 1990	Chimaeridae	32
Hydrolagus	*purpurescens*	(GILBERT, 1905)	Chimaeridae	23
Hydrolagus	*trolli*	DIDIER & SÉRET, 2002	Chimaeridae	20
Harriotta	*chaetirhamphus*	(TANAKA, 1909)	Rhinochimaeridae	4
Harriotta	*raleighana*	GOODE & BEAN, 1895	Rhinochimaeridae	150
Neoharriotta	*carri*	BULLIS & CARPENTER, 1966	Rhinochimaeridae	18

Neoharriotta	*pinnata*	(SCHNAKENBECK, 1931)	Rhinochimaeridae	42
Neoharriotta	*pumila*	DIDIER & STEHMANN, 1996	Rhinochimaeridae	11
Rhinochimaera	*africana*	COMPAGNO, STEHMANN & EBERT, 1990	Rhinochimaeridae	28
Rhinochimaera	*atlantica*	HOLT & BYRNE, 1909	Rhinochimaeridae	53
Rhinochimaera	*pacifica*	(MITSUKURI, 1895)	Rhinochimaeridae	69

3.3.3.6 "Top 20" most studied chimaeriform species

Genus	Species	Author	Family	No of records
Chimaera	*monstrosa*	LINNAEUS, 1758	Chimaeridae	313
Hydrolagus	*colliei*	(LAY & BENNETT, 1839)	Chimaeridae	189
Callorhinchus	*milii*	BORY DE SAINT-VINCENT, 1823	Callorhinchidae	173
Harriotta	*raleighana*	GOODE & BEAN, 1895	Rhinochimaeridae	150
Callorhinchus	*callorynchus*	(LINNAEUS, 1758)	Callorhinchidae	121
Hydrolagus	*affinis*	(DE BRITO CAPELLO, 1868)	Chimaeridae	84
Rhinochimaera	*pacifica*	(MITSUKURI, 1895)	Rhinochimaeridae	69
Chimaera	*ogilbyi*	WAITE, 1898	Chimaeridae	60
Chimaera	*phantasma*	JORDAN & SNYDER, 1900	Chimaeridae	60
Rhinochimaera	*atlantica*	HOLT & BYRNE, 1909	Rhinochimaeridae	53
Callorhinchus	*capensis*	DUMÉRIL, 1865	Callorhinchidae	50
Hydrolagus	*mirabilis*	(COLLETT, 1904)	Chimaeridae	48
Neoharriotta	*pinnata*	(SCHNAKENBECK, 1931)	Rhinochimaeridae	42
Hydrolagus	*novaezealandiae*	(FOWLER, 1911)	Chimaeridae	38
Hydrolagus	*pallidus*	HARDY & STEHMANN, 1990	Chimaeridae	32
Hydrolagus	*africanus*	(GILCHRIST, 1922)	Chimaeridae	28
Hydrolagus	*alberti*	BIGELOW & SCHROEDER, 1951	Chimaeridae	28
Hydrolagus	*mitsukurii*	(JORDAN & SNYDER, 1904)	Chimaeridae	28
Rhinochimaera	*africana*	COMPAGNO, STEHMANN & EBERT, 1990	Rhinochimaeridae	28
Hydrolagus	*barbouri*	(GARMAN, 1908)	Chimaeridae	27

Order/Family	Number of Species	Number of Records
Chimaeriformes	**54**	**1942**
Callorhinchidae	3	344
Chimaeridae	43	1223
Rhinochimaeridae	8	375
Total:	**54**	**1942**

3.3.4 Papers of new extant genera/species

WHITE, W.T. & KYNE, P.M. & HARRIS, M. (2019): Lost before found: A new species of whaler shark *Carcharhinus obsolerus* from the Western Central Pacific known only from historic records. *PLoS ONE, 14 (1): e0209387*

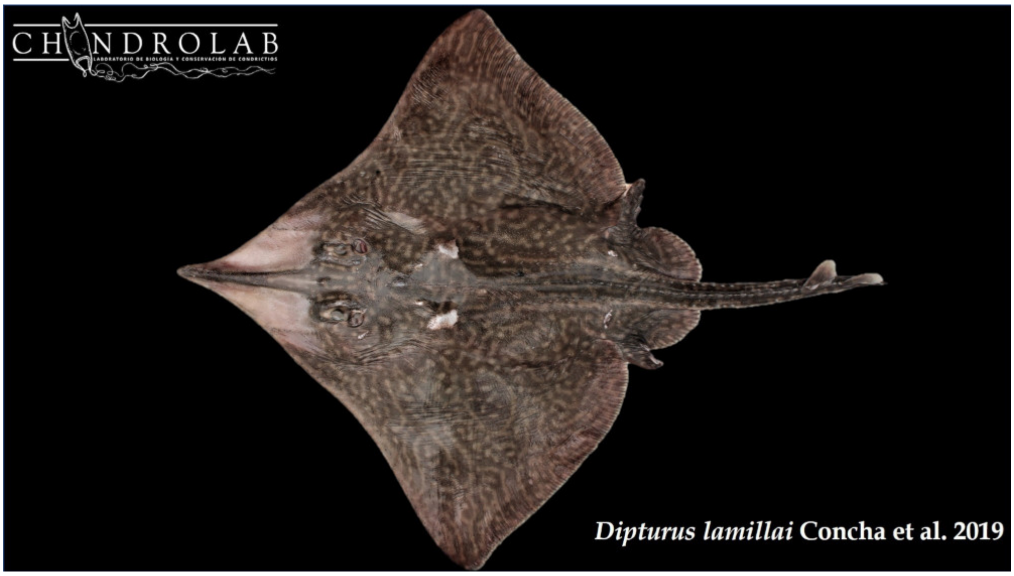
New species: *Carcharhinus obsolerus*

Abstract: *Carcharhinus obsolerus* is described based on three specimens from Borneo, Thailand and Vietnam in the Western Central Pacific. It belongs to the *porosus* subgroup which is characterised by having the second dorsal-fin insertion opposite the anal-fin midbase. It most closely resembles *C. borneensis* but differs in tooth morphology and counts and a number of morphological characters, including lack of enlarged hyomandibular pores which are diagnostic of *C. borneensis*. The historic range of *C. obsolerus* sp. nov. is under intense fishing pressure and this species has not been recorded anywhere in over 80 years. There is an urgent need to assess its extinction risk status for the IUCN Red List of Threatened Species. With so few known records, there is a possibility that *Carcharhinus obsolerus* sp. nov. has been lost from the marine environment before any understanding could be gained of its full historic distribution, biology, ecosystem role, and importance in local fisheries.

LAST, P.R. & SÉRET, B. & NAYLOR, G.J.P. (2019): Description of *Rhinobatos ranongensis* sp. nov. (Rhinopristiformes: Rhinobatidae) from the Andaman Sea and Bay of Bengal with a review of its northern Indian Ocean congeners. *Zootaxa, 4576 (2): 257–287*

New species: *Rhinobatos ranongensis*

Abstract: A new species of guitarfish, *Rhinobatos ranongensis* sp. nov., is described from 5 preserved specimens, and images and tissue samples of additional material, collected from the Andaman Sea and Bay of Bengal. This species co-occurs in the eastern sector of the northern Indian Ocean with two poorly defined congeners, *R. annandalei*Norman and *R. lionotus* Norman, which have been misidentified and confused with Indo-Pacific congeners since they were first described in 1926. Norman's species are rediagnosed based on limited new material and a re-examination of the types. In the western sector of the northern Indian Ocean, *Rhinobatos annandalei* has been confused in recent literature with the sympatric *R. punctifer* Compagno and Randall, which is represented by four primary colour morphs, including a white-spotted colour morph resembling *R. annandalei*. *Rhinobatos punctifer* also displays strong intraspecific variability and sexual dimorphism in some body dimensions. These four species of *Rhinobatos* have unique MtDna sequences and belong to a clade of Indo-West Pacific species that are morphologically similar. Despite the relatively small numbers of specimens available for investigation, these species exhibit some clear differences in body proportions, meristics and squamation. *Rhinobatos ranongensis*sp. nov. differs from its northern Indian Ocean congeners through a combination of a relatively narrow disc and mouth, high vertebral count, long snout, low dorsal fins, and being largely plain coloured. A new lectotype and a paralectotype are designated for the syntypes of *R. annandalei*, and the four primary colour forms of *R. punctifer*, the plain, white-spotted and ocellated morphs, are described and the three nominal species rediagnosed. A key is provided to the four known members of the genus in the northern Indian Ocean.

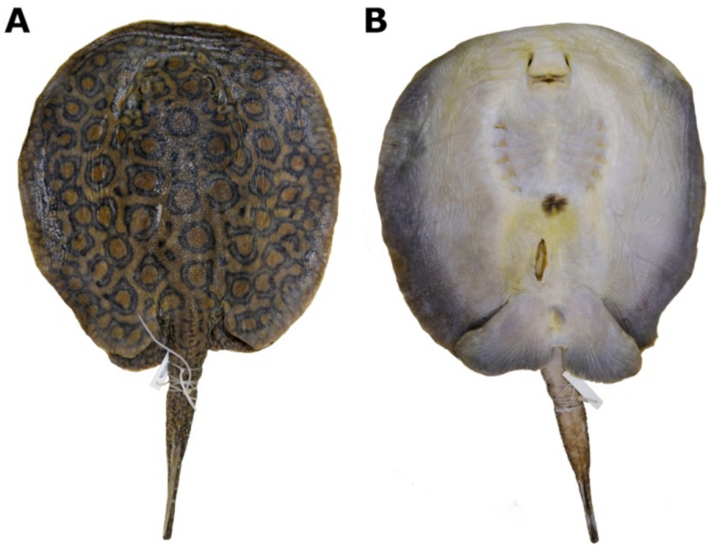


CONCHA, F.J. & CAIRA, J.N. & EBERT, D.A. & POMPERT, J.H.W. (2019): Redescription and taxonomic status of *Dipturus chilensis* (Guichenot, 1848), and description of *Dipturus lamillai* sp. nov. (Rajiformes: Rajidae), a new species of long-snout skate from the Falkland Islands. *Zootaxa, 4590 (5): 501–524*

New species: *Dipturus lamillai*

Abstract: Recent molecular evidence has called into question the identity of skates collected in the waters off the Falkland Islands previously identified as *Zearaja chilensis*. NADH2 sequence data indicate that these specimens are not conspecific with those currently referred to as *Z. chilensis* from Chile and, in fact, represent a novel cryptic species. This study aimed to investigate this hypothesis based on morphological comparisons

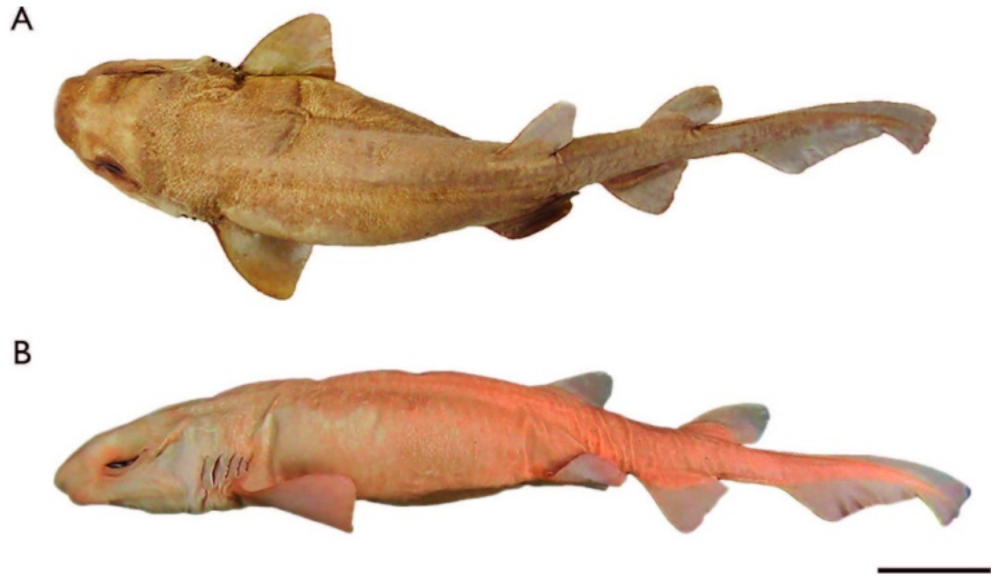
of specimens from the coasts of both western and eastern South America. In total, 50 specimens from Chile and 41 specimens from the Falkland Islands were collected and examined; morphometric data were generated for a subset of specimens from both areas. NADH2 sequence data were generated for a total of 19 specimens from both areas, as well as specimens of *Z. nasuta* from New Zealand, *D. pullopunctatus* from South Africa, *D. oxyrinchus* from the Azores, *Okamejei hollandi*, and *O. cairae* from Borneo, and *O. kenojei* from Japan. Based on morphological and molecular analyses, *Zearaja* is synonymized with *Dipturus* and species assigned to the former genus are transferred to the latter genus. A neotype is designated for *D. chilensis* and this species is redescribed. *Dipturus lamillai* sp. nov. is described based on specimens from the Falkland Islands. Comparison of our NADH2 data with data for mitochondrial genomes generated from tissue samples taken from two specimens originally identified as *Z. chilensis*, indicate that, while the sample from Chile came from a specimen of *D. chilensis,* that from the skate steak obtained from a restaurant in Korea actually came from a specimen of *D. lamillai* sp. nov. This emphasizes the importance of confirming both the provenance and identity of specimens from which sequence data are generated and submitted to GenBank if misidentifications are to be avoided.



DA SILVA, J.P.C.B. & LOBODA, T.S. (2019): *Potamotrygon marquesi*, a new species of neotropical freshwater stingray (Potamotrygonidae) from the Brazilian Amazon Basin. *Journal of Fish Biology, in press*

New species: *Potamotrygon marquesi*

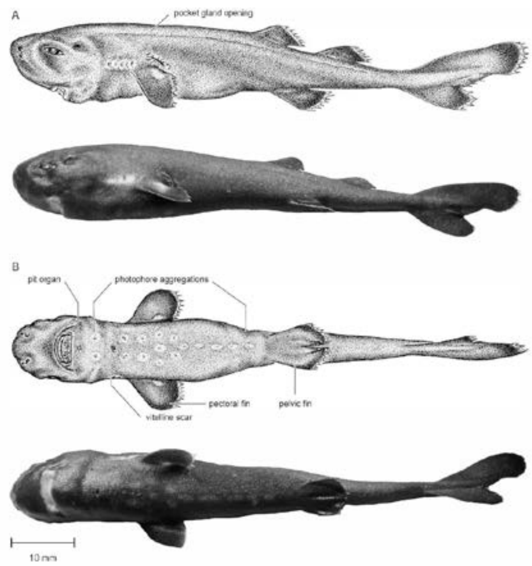
Abstract: *Potamotrygon marquesi*, sp. nov., is described and compared with other species of *Potamotrygon* occurring in the Amazon Basin. The identity of this new species is supported by an extensive external and internal morphological study including coloration pattern, squamation, skeleton and ventral lateral-line canals. Morphometrics and meristics were used to further distinguish *P. marquesi* from congeners. *Potamotrygon marquesi* was first considered to fall within the range of variation found in *P. motoro*. However, even with an extensive variation in coloration observed in *P. motoro*, this new species presents a series of autapomorphies that confidently distinguishes it from what is understood as the morphological variation found in *P. motoro*. Additional morphological characters that diagnose *P. marquesi* include three angular cartilages, asymmetrical star-shaped denticles, a single regular row of spines on tail dorsum, lateral row of caudal spines near the barb insertion, dorsal disc background in beige and grey mixed with shades of grey and bearing open and closed bicolored rings, among others. Although presenting a gap of distribution along the west–east extension of the Amazon Basin, its diagnostic charactistics are consistent in both recorded regions. Our study supports the need for many morphological characters to robustly distinguish members of Potamotrygoninae considering their extremely variable dorsal disc color pattern.



SOARES, K.D.A. & DE CARVALHO, M.R. & SCHWINGEL, P.R. & GADIG, O.B.F. (2019): A New Species of *Parmaturus* (Chondrichthyes: Carcharhiniformes: Scyliorhinidae) from Brazil, Southwestern Atlantic. *Copeia, 107 (2): 314-322*

New species: *Parmaturus angelae*

Abstract: A new Southwestern Atlantic species of *Parmaturus, P. angelae,* new species, is described from two specimens captured off Brazil. It is distinguished from congeners by the following characters: origin of the first dorsal fin anterior to pelvic-fin origin, presence of well-developed upper and lower caudal crests of denticles, dorsal fins subequal, lateral denticles teardrop-shaped and lacking lateral cusplets, denticles evenly spaced, proportional dimensions, and vertebral counts. *Parmaturus angelae,* new species, is the second species of the genus reported from the Atlantic Ocean and only the third species outside of the Indo-West Pacific region. *Parmaturus* remains rather poorly defined as only two species have been studied anatomically in any detail.



GRACE, M.A. & DOOSEY, M.H. & DENTON, J.S.S. & NAYLOR, G.J.P. & BART, H.L. & MAISEY, J.G. (2019): A new Western North Atlantic Ocean kitefin shark (Squaliformes: Dalatiidae) from the Gulf of Mexico. *Zootaxa, 4619 (1): 109–120*

New species: *Mollisquama mississippiensis*

Abstract: A new species of kitefin shark (Squaliformes; Dalatiidae) is described from the Gulf of Mexico (Western North Atlantic Ocean) based on five diagnostic features not seen on the only other known *Mollisquama* specimen, the holotype of *Mollisquama parini* Dolganov which was captured in the Eastern South Pacific Ocean. The new species, *Mollisquama mississippiensis* **sp. nov.**,is distinguished from its congener by a putative pit organ located ventrally just posterior of the lower jaw margin center, photophores irregularly distributed along many areas of the body, 16 distinct ventral-abdominal photophore aggregations, and two differences associated with the dentition. Other potential distinguishing features are 10 fewer vertebrae than *Mollisquama parini* and six morphometric proportional differences that exceeded +/- 20% from the holotype.

RUTLEDGE, K.M. (2019): A New Guitarfish of the Genus *Pseudobatos* (Batoidea: Rhinobatidae) with Key to the Guitarfishes of the Gulf of California. *Copeia, 107 (3): 451-463*

New species: *Pseudobatos buthi*

Abstract: A new guitarfish of the genus *Pseudobatos* is described based on 82 specimens obtained from the Gulf of California. Sixty-three morphometric measurements were taken on all specimens, and on ten specimens from each of three congeners. A principal component analysis and linear discriminant analysis were performed on these morphometric data for discrimination. The new species (~685 mm TL) is most similar to *Pseudobatos productus* but differs in having a narrower maximum disc width (30–35% vs. 36–38% TL), shorter distance from nostril to disc margin (2.8–4.0% vs. 4.2–5.2% TL), narrower disc width at anterior orbit (12–19% vs. 20–22% TL), and a narrower tip of snout width (3% vs. 4–6% TL). The species is also less densely scaled between the orbits and has less pronounced rostral thorns than *Pseudobatos productus*. A key to the guitarfishes of the Gulf of California is also provided.

DOLGANOV, V.N. (2019): *Squalus boretzi* sp. n. (Squalidae), a New Squalid Shark Species from the Emperor Seamount Chain, Pacific Ocean [in Russian with English abstract]. *Biology of the Sea, 45 (4): 279-285*

New species: *Squalus boretzi*

Abstract: A deep-sea shark species, *Squalus boretzi* sp. n., has been described from the Emperor Seamount Chain. Its measurable traits, structure of neurocranium and claspers, number of abdominal and caudal vertebrae, teeth rows, intestinal spiral valve whorls, and biology, reported in the article, have been analyzed in 22 specimens with a body length of 357–952 mm. The differences between the new species and the other closely related members of the genus are discussed.

EBERT, D.A. & LESLIE, R.W. (2019): *Leucoraja elaineae* sp. nov., a new rough skate (Rajiformes: Rajidae) from the Western Indian Ocean. *Zootaxa, 4691 (3): 225–234*

New species: *Leucoraja elaineae*

Abstract: A new species of the genus *Leucoraja* is described from off Kenya in the Western Indian Ocean (WIO). The new species was collected during a survey of the R/V *Fridtiof Nansen*. *Leucoraja elaineae* **sp. n.** is the third species in the genus found to occur in the WIO, and the only species in the genus *Leucoraja* known exclusively from this region. Its closest geographic congener *L. wallacei*, occurring from Namibia to southern Mozambique, can be separated by a combination of morphological and meristic characters including an elongated, pronounced snout (*L. elaineae* **sp. n.**) vs a short, blunt snout (*L. wallacei*), higher predorsal vertebral (107 vs 64-74) and pectoral fin radial counts (77 vs 61-64), a dorsal surface pattern consisting of a single ocelli at the midbase of each pectoral fin, paired small white spots, and no banding or crossbars on its tail vs numerous rosettes and whorls, no prominent ocelli at the pectoral fin bases, and 3-4 tail bands. The only other WIO *Leucoraja* species in the genus, *L. compagnoi* is known only from South Africa and has a short, blunt snout, a lower upper tooth count (38 vs 57 in *L. elaineae* **sp. n.**), a plain dorsal disc color with no markings and distinct bands on its tail. All other members of the genus occur in the North Atlantic, except one species that occurs in the eastern Central Atlantic and one in the eastern Indian Ocean.

WHITE, W.T. & FAHMI & WEIGMANN, S. (2019): A new genus and species of catshark (Carcharhiniformes: Scyliorhinidae) from eastern Indonesia. *Zootaxa, 4691 (5): 444–460*

New genus: *Akheilos*

New species: *Akheilos suwartanai*

Abstract: A new genus and species of catshark is described based on a single specimen collected off Ambon in the Maluku Islands of eastern Indonesia. *Akheilos suwartanai* belongs to the subfamily Schroederichthyinae which differs from the other catsharks in a combination of: similar sized dorsal fins, supraorbital crests present, pseudosiphon present on claspers, broad subocular ridges under eyes, posterior nasal flaps present, tips of rostral cartilage fused into a rostral node. It represents the first record of this subfamily outside of the Americas. *Akheilos* differs from the other genus in the subfamily, *Schroederichthys* in a combination of: clasper groove not fused dorsally, ventral lobe of caudal fin produced, more intestinal valve turns, anal fin slightly larger than second dorsal fin, and in colour pattern.

3.4 Parasitology

3.4.1 Research Articles

APPY, R..G. & GOFFREDI, S.K. & PERNET, B. & LATINO, C. (2019) Experimental Elucidation of the Life Cycle of Rhinebothrium urobatidium (Cestoda: Rhinebothriidea) from the Round Stingray (Urobatis halleri: Myliobatiformes) to First and Second Intermediate Hosts. *Bulletin of the Southern California Academy of Sciences, 118 (3): 139-157* https://dx.doi.org/10.3160/0038-3872-118.3.139

BANERJEE, S. & MANNA, B. (2019) Wenyonia sanyali sp.n. (Platyhelminthes: Cestoidea) from Chilloscyllium griseum (Bamboo Shark) in West Bengal, India. *Proceedings of the Zoological Society, 72 (2): 118–121* https://dx.doi.org/10.1007/s12595-017-0238-7

BEER, A. & INGRAM, T. & RANDHAWA, H.S. (2019) Role of ecology and phylogeny in determining tapeworm assemblages in skates (Rajiformes). *Journal of Helminthology, 93 (6): 738-751* https://dx.doi.org/10.1017/s0022149x18000809

BENMESLEM, K. & RANDHAWA, H.S. & TAZEROUTI, F. (2019) Description of a new species of rhinebothriidean tapeworm from the skate Dipturus batis in the Mediterranean Sea. *Journal of Helminthology, 93 (5): 589-600* https://dx.doi.org/10.1017/s0022149x18000676

BERNOT, J.P. & CAIRA, J.N. (2019) Site specificity and attachment mode of Symcallio and Calliobothrium species (Cestoda: "Tetraphyllidea") in smoothhound sharks of the genus Mustelus (Carcharhiniformes: Triakidae). *Peerj, 7: e7264* https://dx.doi.org/10.7717/peerj.7264

CARRASSON, M. & DALLARES, S. & CARTES, J.E. & CONSTENLA, M. & PEREZ-DEL-OLMO, A. & ZUCCA, L. & KOSTADINOVA, A. (2019) Drivers of parasite community structure in fishes of the continental shelf of the Western Mediterranean: the importance of host phylogeny and autecological traits. *International Journal for Parasitology, 49 (9): 669-683* https://dx.doi.org/10.1016/j.ijpara.2019.04.004

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3.4.2 Descriptions of new Parasites of Elasmobranchs (genera/species)

3.4.2.1 List of new Parasites of Elasmobranchs (genera)

Electrovermis	WARREN & BULLARD, 2019	(Diplostomida: Aporocotylidae)
Gymnurahemecus	WARREN, RUIZ, WHELAN, KRITSKY & BULLARD, 2019	(Diplostomida: Aporocotylidae)
Holocephalocotyle	DEROUICHE, NEIFAR, GEY, JUSTINE & TAZEROUTI, 2019	(Monocotylidea: Monocotylidae)
Mixobothrium	COLEMAN,BEVERIDGE & CAMPBELL, 2019	(Rhinebothriidea: Rhinebothriidae)
Ruptobothrium	COLEMAN,BEVERIDGE & CAMPBELL, 2019	(Rhinebothriidea: Rhinebothriidae)

3.4.2.2 List of new Parasites of Elasmobranchs (species)

Acanthobothrium halehae	MALEKI, MALEK & PALMS, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Acanthobothrium kurdistanense	MALEKI, MALEK & PALMS, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Acanthobothrium makranense	MALEKI, MALEK & PALMS, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Acanthobothrium omanense	MALEKI, MALEK & PALMS, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Acanthobothrium persicum	MALEKI, MALEK & PALMS, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Acanthobothrium soniae	ZARAGOZA-TAPIA, PULIDO-FLORES, VIOLANTE-GONZALEZ & MONKS, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Acanthobothrium vidali	ZARAGOZA-TAPIA, PULIDO-FLORES, VIOLANTE-GONZALEZ & MONKS, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Acanthocotyle atacamensis	NACARI, SEPULVEDA, ESCRIBANO & OLIVA, 2019	(Gyrodactylidea: Acanthocotylidae)
Acanthocotyle imo	NACARI, SEPULVEDA, ESCRIBANO & OLIVA, 2019	(Gyrodactylidea: Acanthocotylidae)
Branchellion spindolaorum	RUIZ-ESCOBAR & OCEGUERA-FIGUEROA, 2019	(Rhynchobdellida: Piscicolidae)
Calicotyle hydrolagi	ÑACARI, SEPULVEDA, DROGUET, ESCRIBANO & OLIVA, 2019	(Monocotylidea: Monocotylidae)
Caulobothrium pedunculatum	COLEMAN, BEVERIDGE & CAMPBELL, 2019	(Tetraphyllidea: Phyllobothriidae)
Dendromonocotyle fukushimaensis	KITAMURA & OGAWA, 2019	(Monocotylidea: Monocotylidae)
Dendromonocotyle tsutsumii	KITAMURA & OGAWA, 2019	(Monocotylidea: Monocotylidae)
Dollfusiella nimai	SHAFIEI & HASELI, 2019	(Trypanorhyncha: Eutetrarhynchidae)
Echthrogaleus spinulus	MORALES-SERNA, CROW, MONTES & GONZALEZ, 2019	(Siphonostomatoida: Pandaridae)
Electrovermis zappum	WARREN & BULLARD, 2019	(Diplostomida: Aporocotylidae)

Empruthotrema aoneken	IRIGOITIA, BRAICOVICH, ROSSIN, CANEL, LEVY, FARBER & TIMI, 2019	(Monocotylidea: Monocotylidae)
Empruthotrema dorae	IRIGOITIA, BRAICOVICH, ROSSIN, CANEL, LEVY, FARBER & TIMI, 2019	(Monocotylidea: Monocotylidae)
Empruthotrema orashken	IRIGOITIA, BRAICOVICH, ROSSIN, CANEL, LEVY, FARBER & TIMI, 2019	(Monocotylidea: Monocotylidae)
Gorgorhynchus occultus	SMALES, BARTON & CHISHOLM, 2019	(Echinorhynchida: Rhadinorhynchidae)
Gymnurahemecus bulbosus	WARREN, RUIZ, WHELAN, KRITSKY & BULLARD, 2019	(Diplostomida: Aporocotylidae)
Holocephalocotyle monstrosae	DEROUICHE, NEIFAR, GEY, JUSTINE & TAZEROUTI, 2019	(Monocotylidea: Monocotylidae)
Mawsonascaris vulvolacinata	SHAMSI, DANG, ZHU & NOWAK, 2019	(Rhabditida: Acanthocheilidae)
Mixobothrium queenslandense	COLEMAN, G.M. & BEVERIDGE, I. & CAMPBELL, 2019	(Rhinebothriidea: Rhinebothriidae)
Neoalbionella benzipirata	RUIZ, DRIGGERS & BULLARD, 2019	(Siphonostomatoida: Lernaeopodidae)
Neoalbionella dannytangi	RUIZ & BULLARD, 2019	(Siphonostomatoida: Lernaeopodidae)
Nybelinia balinensis	PALM, PALM & HASELI, 2019	(Trypanorhyncha: Tentaculariidae)
Nybelinia mobulicola	PALM, PALM & HASELI, 2019	(Trypanorhyncha: Tentaculariidae)
Orygmatobothrium persiense	MOGHADAM & HASELI, 2019	(Phyllobothriidea: Phyllobothriidae)
Pentaloculum hoi	EUDY, CAIRA & JENSEN, 2019	(Tetraphyllidea: Phyllobothriidae)
Phoreiobothrium golchini	DARVISHI & HASELI, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Phoreiobothrium rozatii	DARVISHI & HASELI, 2019	(Onchoproteocephalideadea: Onchobothriidae)
Piscicapillaria bursata	MORAVEC & BARTON, 2019	(Enoplida: Capillariidae)
Podocerus jinbe	TOMIKAWA, YANAGISAWA, HIGASHIJI, YANO & VADER, 2019	(Amphipoda: Podoceridae)
Rhabdotobothrium anoxypristidis	COLEMAN, G.M. & BEVERIDGE, I. & CAMPBELL, 2019	(Rhinebothriidea: Rhinebothriidae)
Rhabdotobothrium meridionale	COLEMAN, G.M. & BEVERIDGE, I. & CAMPBELL, 2019	(Rhinebothriidea: Rhinebothriidae)
Ruptobothrium louiseuzeti	COLEMAN, G.M. & BEVERIDGE, I. & CAMPBELL, 2019	(Rhinebothriidea: Rhinebothriidae)
Scalithrium australiense	COLEMAN, G.M. & BEVERIDGE, I. & CAMPBELL, 2019	(Rhinebothriidea: Rhinebothriidae)
Terranova pectinolabiata	SHAMSI, BARTON & ZHU, 2019	(Ascaridida: Anisakidae)
Wenyonia sanyali	BANERJEE & MANNA, 2019	(Caryophyllidea: Caryophyllaeidae)

3.4.3 Papers of new parasites genera/species

RUIZ, C.F. & DRIGGERS, W.B. & BULLARD, S.A. (2019): A New Species of *Neoalbionella* (Copepoda: Siphonostomatoida: Lernaeopodidae) from Skin of the Gulper Shark, *Centrophorus granulosus* (Squaliformes: Centrophoridae) in the Northern Gulf of Mexico. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh, 108 (1): 67-87*

New species: *Neoalbionella benzipirata*

Abstract: Using light and scanning electron microscopy of male and female copepods, we herein describe a new species of *Neoalbionella*Özdikmen, 2008 (Copepoda: Lernaeopodidae), *Neoalbionella benzipirata* n. sp., infecting the skin of the gulper shark, *Centrophorus granulosus* (Bloch and Schneider, 1801), in the northern Gulf of Mexico. Females of the new species were assigned to *Neoalbionella* by having 3 setae on the maxillule lateral palp (vs. 2 setae in *Lernaeopoda* Nordmann, 1832) and a single accessory denticle on the maxilliped subchela claw (vs. ≥2 denticles in *Lernaeopoda*). Females of the new species resemble those of *Neoalbionella longicaudata* (Hansen, 1923) Özdikmen, 2008 but can be differentiated from them and those of all congeners by having a unique configuration of 16 dorsocephalic sensilla; an antennule terminal segment having 6 apical setae comprising tubercles 1 and 3, digitiform seta 4, 2 subequal setae of complex 5, and flagelliform seta 6; an antenna exopod with a thickened dorsal ridge, smooth (convex) outer surface with 2 short papillae, and rugose (concave) inner surface plus a terminal endopodal segment having a large dorsal hook, medial spine, bifid distal tubercle, and spinulose ventral process; a mandible having the formula P1, S1, P1, S1, P1, S1, B5; and a single pair of anterolateral spines on the mouth cone labium. Males attached to the posteroventral surface of the females' genital trunk were assigned to *Neoalbionella* by having tapered (not inflated) caudal rami directed posteroventrally. They were differentiated from previously reported congeneric males by having an antennule with the same number and configuration of apical setae as the female; an antenna with a spatulate exopod having minute spinules along its apex plus a terminal endopodal segment with components the same as the female; a mandible with formula P2, S1, P1, S1, B5; a labium with 1 pair of anterolateral spines like the female; and a conspicuous mediative process with bifid tip. Detail of the dorsocephalic shield (in females) and mouth cone labium (in both sexes) previously had not been used to diagnose *Neoalbionella* spp. We also dissected voucher specimens of "*Neoalbionella longicaudata*" (collected from gulper sharks in the western Pacific Ocean off Japan by Shiino in 1956), which we morphologically diagnosed as an innominate species, *Neoalbionella* sp. This is the first report of a species of *Neoalbionella* from the Gulf of Mexico and the second species of *Neoalbionella* reported from *C. granulosus*, a deepwater shark seldom encountered and surveyed for parasitology.

MALEKI, L. & MALEK, M. & RASTGOO, A. (2019): *Acanthobothrium chabahariensis* n. sp. (Cestoda: Onchoproteocephalidea) in the cowtail stingray *Pastinachus* cf. *sephen* (Myliobatiformes: Dasyatidae) from the Gulf of Oman, Iran. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh, 108 (1): 67-87*

New species: *Acanthobothrium chabahariense*

Abstract: A new species of genus *Acanthobothrium* Blanchard, 1848 is described from the spiral intestine of *Pastinachus* cf. *sephen*(Forsskal, 1775) from Iranian coasts of the Gulf of Oman. The morphological characteristics of specimens were analyzed with light and scanning electron microscopy. *Acanthobothrium chabahariense* n. sp. is a category 1 species (with <15mm total length, <50 proglottids, <80 testes and a symmetrical ovary) together with 48 other species. The new species was compared with species from the Western Indian Ocean and those reported from *Pastinachus*. It is distinguished from the other species from the region within the genus by a combination of the following morphological features: total length, number of proglottids, hook length, number of testes and ovarian lobe length. *Pastinachus sephen* is a complex group still with no taxonomic resolution; therefore, the identity of the host in this study area is in question. Because of the

molecular study of specimens from the Gulf of Oman did not completely correspond with *P. sephen* since they were introduced as *P.* cf. *sephen*. This brings the total number of species of *Acanthobothrium* from *Pastinachus* to 11 and the total number of *Acanthobothrium* species described from the Persian Gulf and the Gulf of Oman to seven. In addition, an identification key to the *Acanthobothrium* species occurring in the *Pastinachus* species was provided.

KITAMURA, A. & OGAWA, K. (2019): Three species of *Dendromonocotyle* Hargis, 1955 (Monogenea: Monocotylidae) collected from Japanese rays. *Systematic Parasitology, 96 (2): 233–243*

New species: *Dendromonocotyle tsutsumii*, *Dendromonocotyle fukushimaensis*

Abstract: Eighteen species of *Dendromonocotyle* Hargis, 1955 (Monogenea: Monocotylidae) have so far been described from elasmobranchs worldwide. In this paper, two new species are described; *Dendromonocotyle tsutsumii* n. sp. from the skin of the Japanese eagle ray, *Myliobatis tobijei*Bleeker from Tokyo Bay and the pitted stingray, *Dasyatis matsubarai* Miyosi, from Ooarai, Ibaraki Prefecture, Japan, and *Dendromonocotyle fukushimaensis* n. sp. from the skin of the cow stingray, *Dasyatis ushiei* (Jordan & Hubbs) reared at an aquarium in Fukushima Prefecture, Japan. *Dendromonocotyle tsutsumii* is distinguished from the congeners by the presence of a sclerotised duct connecting the vagina with the seminal receptacle, and *De. fukushimaensis* by the large body size and the presence of a donut-shaped structure encircling the male copulatory organ near its distal end. Additionally, the reproductive system of *Dendromonocotyle akajeii* Ho & Perkins, 1980 is redescribed, based on specimens from the skin of the whip stingray, *Hemitrygon akajei* (Müller & Henle) (syn. *Dasyatis akajei*) caught in Hamana Lake, Shizuoka Prefecture, Japan. A key to the 20 species of *Dendromonocotyle* including the present new species is provided.

WARREN, M.B. & RUIZ, C.F. & WHELAN, N.V. & KRITSKY, D.C. & BULLARD, S.A. (2019): *Gymnurahemecus bulbosus* gen. et sp. nov. (Digenea: Aporocotylidae) infecting smooth butterfly rays, *Gymnura micrura* (Myliobatiformes: Gymnuridae) in the northern Gulf of Mexico, with a taxonomic key and further evidence for monophyly of chondrichthyan blood flukes. *Parasitology Research, in press*

New genus: *Gymnurahemecus*

New species: *Gymnurahemecus bulbosus*

Abstract: *Gymnurahemecus bulbosus* gen. et sp. nov. infects the heart of smooth butterfly rays, *Gymnura micrura* in the Gulf of Mexico. *Gymnurahemecus* differs from all other accepted aporocotylid genera by having one column of C-shaped lateral tegumental spines, a medial oesophageal bulb anterior to a diverticulate region of the oesophagus, inverse U-shaped intestinal caeca, a non-looped testis, an oviducal ampulla, a Laurer’s canal, and a post-caecal common genital pore. The new species, the shark blood flukes (*Selachohemecus* spp. and *Hyperandrotrema* spp.), and the chimaera blood fluke *Chimaerohemecus trondheimensis* are unique by having C-shaped lateral tegumental spines. *Selachohemecus* spp. and the new species have a single column of lateral tegumental spines, whereas *Hyperandrotrema* spp. and *C. trondheimensis* have 2–7 columns of lateral tegumental spines. The new species differs from *Selachohemecus* spp. most notably by having an inverse U-shaped intestine. The other ray blood flukes (*Orchispirium heterovitellatum*, *Myliobaticola richardheardi*, and *Ogawaia glaucostegi*) differ from the new species by lacking lateral tegumental spines, a medial oesophageal bulb, and a Laurer’s canal and by having a looped testis. Phylogenetic analysis using large subunit ribosomal DNA (28S) indicated that the new species is sister to the clade that includes the other sequenced adult blood fluke (*O. glaucostegi*), which infects a ray in Australia. These results agree with and extend previous morphology- and nucleotide-based phylogenetic assertions that the blood flukes of early-branching jawed craniates (Chondrichthyes) are monophyletic and phylogenetically separated from the blood flukes of later-branching ray-finned fishes (Actinopterygii: Euteleostei).

SHAFIEI, S. & HASELI, M. (2019): A new species of *Dollfusiella* Campbell & Beveridge, 1994 (Cestoda: Eutetrarhynchidae), with remarks on *Halysiorhynchus macrocephalus* (Shipley & Hornell, 1906) (Cestoda:

Mixodigmatidae) from the bowmouth guitarfish *Rhina ancylostoma* Bloch & Schneider (Rhinidae) in the Persian Gulf. *Systematic Parasitology, 96 (4–5): 369–379*

New species: *Dollfusiella nimai*

Abstract: *Dollfusiella nimai* n. sp. (Cestoda: Eutetrarhynchidae) is described from the intestine of *Rhina ancylostoma* Bloch & Schneider in the Persian Gulf. The number of the hooks per half spiral row in the metabasal tentacular armature distinguishes the new species from its congeners, except for *D*. *vooremi* (São Clemente & Gomes, 1989) possessing approximately the same number of hooks per half spiral row. While the principle hooks 1(1′)–21(21′) were homeomorphous in the metabasal armature of *D*. *nimai* n. sp., the billhooks on the antibothrial surface and the uncinate hooks on the bothrial surface were the principle hooks 1(1′)–16(16′) in the metabasal armature of *D*. *vooremi*. *Dollfusiella nimai* n. sp. most closely resembles *D*. *michiae* (Southwell, 1929) in the tentacular armature as well as the morphology of the scolex and strobila but differs clearly in the number of the hooks per half spiral row in the metabasal tentacular armature (25–26 *vs* 16 respectively). A detailed examination of the specimens of *Halysiorhynchus macrocephalus* (Shipley & Hornell, 1906) (Cestoda: Mixodigmatidae) ex *R. ancylostoma* from the Persian Gulf revealed intraspecific variability including the number of the principle hooks per half spiral row in the metabasal armature, the number of the hook rows in the basal armature, and the size of the basal hooks.

MOGHADAM, F.E. & HASELI, M. (2019): *Orygmatobothrium persiense* n. sp. (Cestoda: Phyllobothriidea) from the Arabian Smooth-Hound Shark *Mustelus mosis* (Triakidae) in the Persian Gulf. *Acta Parasitologica, in press*

New species: *Orygmatobothrium persiense*

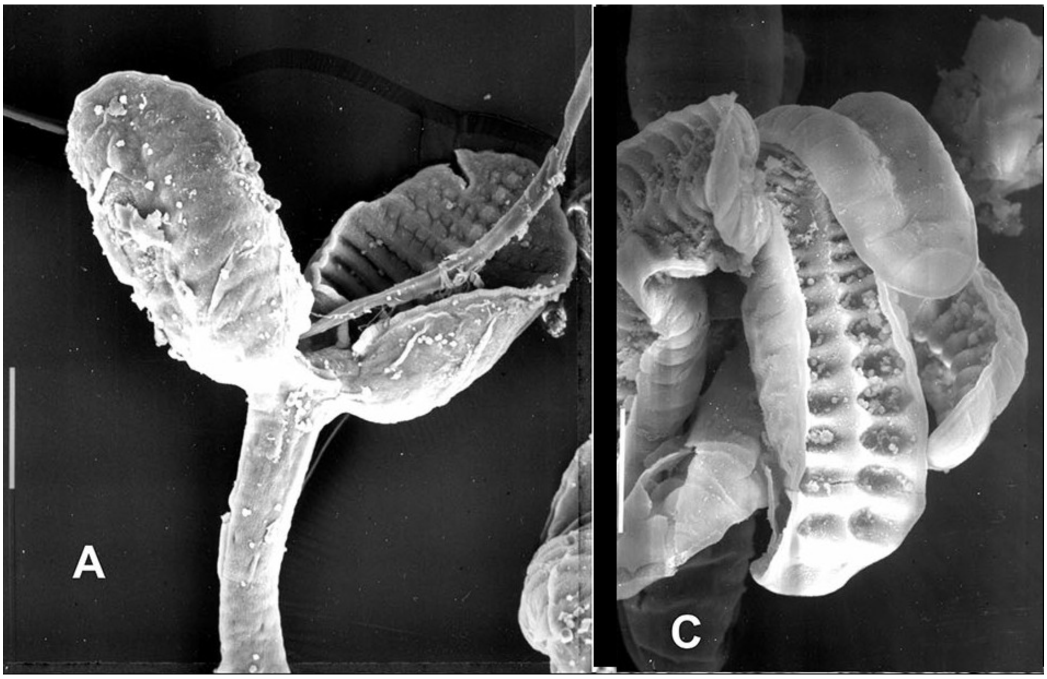
Abstract: A new species of *Orygmatobothrium* Diesing, 1863 was discovered from *Mustelus mosis*Hemprich et Ehrenberg in the north-eastern Persian Gulf. *Orygmatobothrium persiense* n. sp. is the fourth valid species of its genus and differs from its congeners by the number of the proglottids. In addition, the testes distributed in 3–4 rows deep in cross sections, the length of the cephalic peduncle, and a conspicuous bothridial cleft above the apical sucker distinguish the new species, respectively, from *O*. *juani*, *O*. *musteli*, and *O*. *schmittii*. This is the first time that a species of *Orygmatobothrium* is described and reported outside the Atlantic Ocean.

EUDY, E. & CAIRA, J.N. & JENSEN, K. (2019): A New Species of *Pentaloculum* (Cestoda: "Tetraphyllidea") from the Taiwan Saddled Carpetshark, *Cirrhoscyllium formosanum* (Orectolobiformes: Parascylliidae). *Journal of Parasitology, 105 (2): 303-312*

New species: *Pentaloculum hoi*

Abstract: Collection of cestodes from the Taiwan saddled carpetshark, *Cirrhoscyllium formosanum*, for the first time led to the discovery of *Pentaloculum hoi* n. sp. This species provided important insights into the identity of the heretofore monotypic *Pentaloculum*-known previously only from the blind electric ray, *Typhlonarke aysoni*, in New Zealand. The new species differs from *Pentaloculum macrocephalum* in testis number, vitelline follicle and cirrus sac configuration, and in that it is hyperapolytic rather than euapolytic. Maximum-likelihood analysis of sequence data generated for the D1-D3 region of the *28S rDNA* gene not only confirmed this generic placement but also confirmed the close affinities between both species of *Pentaloculum* and specimens previously referred to in the literature as new genus 7 n. sp. 1. Examination of limited material of the latter, including that of a second specimen from which partial *28S rDNA* sequence data were generated here, led to the realization that new genus 7 n. sp. 1 represents an undescribed species of *Pentaloculum*, referred to here as *Pentaloculum* n. sp. 2. All 3 species share bothridia divided into 1 anterior and 2 consecutive pairs of loculi. Given that *Pentaloculum* n. sp. 2 parasitizes a member of the second and only other genus of parascylliid sharks (i.e., *Parascyllium*), we predict that the 4 other species of *Parascyllium* and the 2 other species of *Cirrhoscyllium* are likely to host other species of *Pentaloculum*. The factors that might account for the eclectic host associations of *Pentaloculum*, which include a torpediniform ray and 2 species of orectilobiform sharks, are currently unclear. The compilation of diet data for these elasmobranchs and

determination of the final intermediate hosts for these cestodes would be interesting avenues of further investigation given that cestodes are trophically transmitted between their intermediate and definitive hosts. The phylogenetic affinities of *Pentaloculum* among elasmobranch cestodes remain unresolved.



COLEMAN, G.M. & BEVERIDGE, I. & CAMPBELL, R.A. (2019): New genera, species and records of rhinebothriidean cestodes (Platyhelminthes) parasitic in Australian stingrays (Elasmobranchii: Batoidea). *Systematic Parasitology, 96 (4-5): 347-368*

New genus: *Ruptobothrium, Mixobothrium*

New species: *Ruptobothrium louiseuzeti, Mixobothrium queenslandense, Rhabdotobothrium meridionale, Rhabdotobothrium anoxypristidis, Scalithrium australiense*

Abstract: Collections of rhinebothriidean cestodes (Platyhelminthes) from Australian batoid elasmobranchs revealed the presence of a number of new genera and species. *Ruptobothrium louiseuzeti* n. g., n sp. is described from the reticulate whipray, *Himantura australis* Last, Naylor & Manjaji-Matsumoto, from off the Northern Territory and *Mixobothrium queenslandense* n. g., n sp. is described from the green sawfish, *Pristis zijsron* Bleeker, from off north-eastern Queensland. Two new species of *Rhabdotobothrium* Euzet, 1953 are described: *Rhabdotobothrium meridionale* n. sp. from the southern eagle ray *Myliobatis tenuicaudatus* Hector from off South Australia and *Rhabdotobothrium anoxypristidis* n. sp. from the narrow sawfish, *Anoxypristis cuspidatus*(Latham) from off north Western Australia. A new species of *Scalithrium* Healy & Reyda, 2016, *Scalithrium australiense* n. sp., is described from the reticulate whipray, *Himantura australis*Last, Naylor & Manjaji-Matsumoto, from off northern Western Australia. *Scalithrium smitii*(Shinde, Deshmukh & Jadhav, 1981) n. comb. is reported from Australian waters for the first time in the black spotted stingray *Maculabatis toshi* (Whitley) from off northern Western Australia. New host and geographical records are provided for *Stillabothrium jeanfortiae* Forti, Aprill & Reyda, 2016 from the brown whipray *Maculobatis toshi* (Whitley) and the black-spotted whipray, *Maculabatis* cf*. astra* (Last, Manjaji-Matsumoto & Pogonoski) from Moreton Bay in southern Queensland.

MALEKI, L. & MALEK, M. & PALMS, H.W. (2019): Five new species of *Acanthobothrium* (Cestoda: Onchoproteocephalidea) from the long-tailed butterfly ray, *Gymnura* cf. *poecilura* (Elasmobranchii: Gymnuridae), from the Persian Gulf and Gulf of Oman. *PaleoBios, 36: 1–31*

New species: *Acanthobothrium omanense, Acanthobothrium kurdistanense, Acanthobothrium halehae, Acanthobothrium makranense, Acanthobothrium persicum*

Abstract: Five new species of *Acanthobothrium* Blanchard, 1848 are described from *Gymnura* cf. *poecilura* from the Gulf of Oman and Persian Gulf. They all belong to the Category 1 and can be differentiated from all congeners by a combination of characters, including marginal lappets on the bothridial rim, the lack of spinitrich microtriches on the proximal bothridial surfaces, the position of the genital pore in the posterior one fifth of the proglottid, the direction of the cirrus sac parallel and clinging to the ovarian lobe, the lack of post-vaginal testes, and the interruption of the vitelline follicles by the ovary. The five new species are morphologically similar to each other but differ among each other in their cephalic peduncle length, proglottid and testes number, and the apolysis status. The most similar species to this new group is *Acanthobothrium fogeli* Gloldstein, 1964 from the Gulf of Mexico. The new species differ from *A. fogeli* by the muscular pad size, cephalic peduncle length and having marginal lappets on the bothridial rim. the species of *Acanthobothrium* occurs in three families of elasmobranchs in the Gulf of Oman and Persian Gulf (Dasyatidae, Rhynchobatidae and Gymnuridae). The true identity of many hosts in the region is ambiguous. Therefore, we designated the sampled elasmobranch as *G* cf. *poecilura* in accordance to the previously molecular study on a few individuals from the region.

BANERJEE, S. & MANNA, B. (2019): *Wenyonia sanyali* sp.n. (Platyhelminthes: Cestoidea) from *Chilloscyllium griseum* (Bamboo Shark) in West Bengal, India. *Proceedings of the Zoological Society, 72 (2): 118–121*

New species: *Wenyonia sanyali*

Abstract: The genus *Wenyonia* Woodland, 1923 contains 7 valid species. In this paper *Wenyonia sanyali*sp.n. is described and illustrated from the intestine of *Chilloscyllium griseum* (bamboo shark) from West Bengal, India. The species is characterized by an undifferentiated scolex, without grooves, furrows and bothria; absence of neck and 14–40 testes in apical region that differentiates it from the rest of the described species in the genus.

ZARAGOZA-TAPIA, F. & PULIDO-FLORES, G. & VIOLANTE-GONZALEZ, J. & MONKS, S. (2019): Two new species of *Acanthobothrium* Blanchard, 1848 (Onchobothriidae) in Narcine entemedor Jordan & Starks, 1895 (Narcinidae) from Acapulco, Guerrero, Mexico. *Zookeys, 852: 1-21*

New species: *Acanthobothrium soniae, Acanthobothrium vidali*

Abstract: Two species of *Acanthobothrium* (Onchoproteocephalidea: Onchobothriidae) are described from the spiral intestine of *Narcine entemedor* Jordan & Starks, 1895, in Bahía de Acapulco, Acapulco, Guerrero, Mexico. Based on the four criteria used for the identification of species of *Acanthobothrium*, *A. soniae* **sp. nov.** is a Category 2 species (less than 15 mm in total length with less than 50 proglottids, less than 80 testes, and with the ovary asymmetrical in shape). *Acanthobothrium vidali* **sp. nov.** is a Category 6 species (more than 15 mm in total length with more than 50 proglottids, fewer than 80 testes, and the ovary is asymmetrical). The new species differ from similar species from the Pacific Ocean by total length, the number of proglottids, diameter of the accessory sucker, the length of the cirrus sac, the number of testes per proglottid and the measurements of hooks. With the recognition of *A. soniae* **sp. nov.** and *A. vidali* **sp. nov.**, 42 species of *Acanthobothrium* have been reported from the Pacific coast of the Americas. This is the first report of species of *Acanthobothrium* from a member of *Narcine*from Mexico and it brings the number of species reported from elasmobranchs from the Pacific Coast of Mexico to 13.

SHAMSI, S. & DANG, M. & ZHU, X.C. & NOWAK, B. (2019): Genetic and morphological characterization of *Mawsonascaris vulvolacinata* n. sp. (Nematoda: Anisakidae) and associated histopathology in a wild caught cowtail stingray, *Pastinachus ater*. *Journal of Fish Diseases, 42 (7): 1047-1056*

New species: *Mawsonascaris vulvolacinata*

Abstract: There are limited reports of infectious agents affecting Australian cowtail stingrays. In the present study, a new species of ascaridoid nematode belonging to the genus *Mawsonascaris* is described. The most distinct characteristic features were observed in females (the presence of a polar spine in the eggs and a flap-like projection in the vulval area). An identification key for *Mawsonascaris* spp. is provided. Additionally, internal transcribed spacers (ITS) sequences were obtained for the new species. Alignment of the ITS sequence of the specimens in the present study with those deposited in GenBank showed that there exists no other highly similar sequence. Phylogenetic analyses resulted in a distinct grouping of our specimens supporting morphological distinction from previously described *Mawsonascaris* spp. Histology was used to investigate the pathology caused by the infection. Necrosis, inflammation and fibrosis were evident at the border of the nodules formed by parasite. A large number of parasites were present in muscularis mucosae and submucosa but not in the muscularis of the stomach. The parasites were associated with an increased inflammatory response, which was also found in the muscularis mucosae and submucosa. Similar pathology has been described in elasmobranchs infected by cestodes, although with more severe lesions.

DARVISHI, F.A. & HASELI, M. (2019): Two new species of *Phoreiobothrium* Linton, 1889 (Cestoda: Onchoproteocephalidea) off southern Iran, completing the puzzle of *Phoreiobothrium* faunas in *Rhizoprionodon acutus* species complex. *Parasitology Research, in press*

New species: *Phoreiobothrium rozatii, Phoreiobothrium golchini*

Abstract: It has been shown that the milk shark, *Rhizoprionodon acutus* (Rüppell), is probably a complex of four narrowly distributed cryptic species. To confirm this hypothesis, the oioxenous species of the onchoproteocephalid genus *Phoreiobothrium* Linton, 1889 was recently used to recognize each shark species of this species complex so that *P. nadiae* Caira and Jensen, 2015, *P. swaki* Caira and Jensen, 2015, and *P. jahki* Caira and Jensen, 2015 were described respectively from *Rhizoprionodon* cf. *acutus* 1 off Senegal, *R*. cf. *acutus* 2 off northern Australia, and *R*. cf. *acutus* 3 off Borneo. Nonetheless, the *Phoreiobothrium* fauna of *R. acutus*sensu stricto extending around the Arabian Peninsula remained unknown. In the present study, *P. golchini* n. sp. is described from the fourth type of this shark species complex, i.e. *R. acutus*sensu stricto, from the Persian Gulf. Given the oioxeny of the *Phoreiobothrium* species and the recent phylogeny of the milk shark species complex, if the hypothesis of the allopatric cospeciation of the members of the milk shark species complex and their cestodes is considered, it seems that scolex in *Phoreiobothrium* can diverge more rapidly in size and morphology than strobila. Furthermore, *P. rozatii* n. sp. was described from one of the members of the hardnose shark species complex, i.e. *Carcharhinus macloti* (Müller and Henle), in the Gulf of Oman. This study provides the first data on the occurrence of the species of *Phoreiobothrium* in the Persian Gulf and the Gulf of Oman.

BENMESLEM, K. & RANDHAWA, H.S. & TAZEROUTI, F. (2019): Description of a new species of rhinebothriidean tapeworm from the skate *Dipturus batis* in the Mediterranean Sea. *Journal of Helminthology, 93 (5): 589-600*

New species: *Echeneibothrium algeriensis*

Abstract: Examination of rajid skates off the Algerian coast in the Mediterranean Sea revealed that three of the 33 *Dipturus batis* Linnaeus, 1758 examined harboured a new tapeworm species: *Echeneibothrium algeriensis* n. sp. This new species, collected from the anterior half of the spiral valves, is described on the basis of morphological data from light and scanning electron microscopy. The new species differs from previously described *Echeneibothrium* species by details of the scolex and loculi, total length, the length of the myzorhynchus, the number of proglottides, and the number of testes. Comparison of the diets of the ten skate species common in the Mediterranean basin indicates some varying degree of overlap, suggesting that host specificity in this host–parasite system is determined by other host and/or ecological variables such as adaptations of the parasites to their respective hosts, either on the morpho-anatomical level, in physiological characteristics of the parasite's habitat, in the trophic requirements for the successful transmission of the parasite, or in adaptations to the behavioural characteristics of the host. Furthermore, restricted overlap of *E. algeriensis* n. sp. with congeners in parasite assemblages of *D. batis* indicates some structuring according to

attachment-site preferences. However, attachment-site preferences are not explained solely by morphological compatibility between bothridia and villi. This study reiterates the need to examine multiple factors synergistically in studies on host specificity of parasites, and the need to examine the parasite fauna of hosts across their entire geographical range in order to truly appreciate the biodiversity they harbour.

SHAMSI, S. & BARTON, D.P. & ZHU, X.C. (2019): Description and characterisation of *Terranova pectinolabiata* n. sp. (Nematoda: Anisakidae) in great hammerhead shark, *Sphyrna mokarran* (Ruppell, 1837), in Australia. *Parasitology Research, 118 (7): 2159-2168*

New species: *Terranova pectinolabiata*

Abstract: *Terranova pectinolabiata* n. sp. is described from the great hammerhead, *Sphyrna mokarran*, from Australian waters. This represents the first report of a species of *Terranova* from the host species. The new species is characterised by the morphology of the caudal plates and labia. ITS sequences were obtained for 20 specimens which were identical, despite morphological variation that has traditionally been indicative of separation of species. Additionally, genetic analyses confirmed the identification of the larval *Terranova* Type II previously reported in Australian and New Caledonian waters as *Terranova pectinolabiata* n. sp.

RUIZ-ESCOBAR, F. & OCEGUERA-FIGUEROA, A. (2019): A new species of *Branchellion* Savigny, 1822 (Hirudinida: Piscicolidae), a marine leech parasitic on the giant electric ray *Narcine entemedor* Jordan & Starks (Batoidea: Narcinidae) off Oaxaca, Mexico. *Systematic Parasitology, in press*

New species: *Branchellion spindolaorum*

Abstract: *Branchellion spindolaorum* n. sp. (Hirudinida: Piscicolidae) is described based on specimens found parasitising the giant electric ray *Narcine entemedor* Jordan & Starks off the coast of Oaxaca, Mexico. The new species can be clearly distinguished from the other species of *Branchellion* Savigny, 1822 by the presence of 30 pairs of lateral branchiae and 10 pairs of pulsatile vesicles. The definition of the genus *Branchellion* is expanded to include species with either 30, 31 or 33 pairs of foliaceous (plate-like) lateral branchiae in the urosome. In addition, we provide for the first time for the genus, scanning electron micrographs of the secondary suckers located on the ventral surface of the posterior sucker. Additionally, partial DNA sequences of the mitochondrial cytochrome *c* oxidase subunit 1 (*cox*1) were generated and compared with homologous sequences of other species of the genus. *Branchellion spindolaorum* n. sp. represents the fourth species of the genus known in the Eastern Pacific and the first record of a leech parasitising *N. entemedor*.

COLEMAN, G.M. & BEVERIDGE, I. & CAMPBELL, R.A. (2019): *Caulobothrium pedunculatum* sp. nov., a new species of cestode (Platyhelminthes) parasitic in Australian stingrays (Elasmobranchii: Batoidea). *Transactions of the Royal Society of South Australia, in press*

New species: *Caulobothrium pedunculatum*

Abstract: The cestode genus *Caulobothrium* Baer, 1948 is reported from the Australian region for the first time with the description of *C. pedunculatum* sp. nov. from the spiral intestine of the stingray *Pastinachus ater*(Macleay) (Dasyatidae) from the Northern Territory, Western Australia and Queensland. The new species is differentiated from congeners by the presence of 56–62 loculi per bothridium, two rows of paired loculi, the location of the genital pore and the distribution of the 60–91 testes in the mature segment.

SMALES, L.R. & BARTON, D.P. & CHISHOLM, L.A. (2019): Acanthocephalans from Australian elasmobranchs (Chondrichthyes) with a description of a new species in the genus Gorgorhynchus Chandler, 1934 (Rhadinorhynchidae). *Systematic Parasitology, 96 (7): 565-573*

New species: *Gorgorhynchus occultus*

Abstract: *Gorgorhynchus occultus* n. sp. is described from *Sutorectus tentaculatus* (Peters) (Orectolobidae) collected off Bunbury, Western Australia in 1986. The new species differs from all other species of *Gorgorhynchus* Chandler, 1934 by having a suite of characters including a proboscis hook formula of 18–20 rows of 8–9 hooks, a well-developed neck, irregular circles of small spines in a single anterior field, the male reproductive system limited to the posterior quarter of the trunk and three cement glands. In a survey of 284 sharks collected between 2015 and 2018 from 10 localities in Australian waters, 11 individuals were infected with acanthocephalan cystacanths. One individual of *Sphyrna mokarran* (Rupell) (Sphyrnidae) was infected with *Corynosoma cetaceum* Johnston & Best, 1931. *Serrasentis sagittifer* (Linton, 1889) (Rhadinorhynchidae) was found in five individuals of *S. mokarran*, four individuals of *Syphyrna lewini* (Griffith & Smith) and one individual of *Carcharhinus coatesi* (Whitley) (Carcharhinidae*).* These infections may be accidental because it has been suggested that acanthocephalans cannot tolerate the high levels of urea used by marine and esturine elasmobranchs for osmoregulation. The two most common host species examined, *S. mokarran* and *S. lewini* had the highest intensities and prevalences of infection with *S. sagittifer*. Although more individuals of *S. lewini* were examined, *S. mokarran*had the higher prevalence of infection.

DEROUICHE, I. & NEIFAR, L. & GEY, D. & JUSTINE, J.-L- & TAZEROUTI, F. (2019): *Holocephalocotyle monstrosae* n. gen. n. sp. (Monogenea, Monocotylidae) from the olfactory rosette of the rabbit fish, *Chimaera monstrosa* (Holocephali, Chimaeridae) in deep waters off Algeria. *Parasite, 26: 59*

New genus: *Holocephalocotyle*

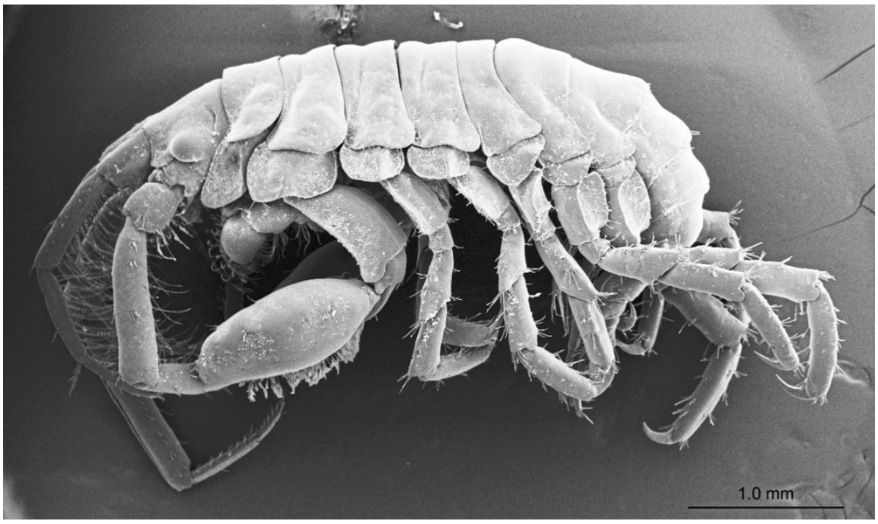
New species: *Holocephalocotyle monstrosae*

Abstract: Based on a molecular and morphological study, a new monocotylid genus, *Holocephalocotyle* n. gen. is proposed to accommodate *Holocephalocotyle monstrosae* n. sp., found on the olfactory rosette of the rabbit fish, *Chimaera monstrosa* Linnaeus (Chondrichthyes, Chimaeridae), from the Mediterranean Sea off Algeria. Identification of fish hosts was confirmed by molecular barcoding of the COI gene. A partial 28S rDNA sequence (D1–D2 domain) of *Holocephalocotyle monstrosae* was obtained; it was distinct from all known monocotylid sequences (*p*-distance: 15.5–23%). A phylogenetic tree constructed from available monocotylid sequences showed that *Holocephalocotyle monstrosae* was included, and basal, in a robust group including species of *Merizocotyle, Mycteronastes* and *Empruthotrema*, confirming that the species is a member of the Merizocotylinae. The new genus is unique among the Merizocotylinae in having a distinctive pattern of haptoral loculi with one central, five peripheral and seven “interperipheral loculi” partially inserted between peripheral loculi and a compartmentalised sclerotised male copulatory organ. The diagnosis of the Merizocotylinae is amended to include this new genus. The new genus represents the second monocotylid genus recorded from holocephalans.

MORAVEC, F. & BARTON, D.P. (2019): Description of *Piscicapillaria bursata* sp. nov. (Capillariidae) and Redescription of *Parascarophis sphyrnae* Campana-Rouget, 1955 (Cystidicolidae), Two Nematode Parasites of Hammerhead Sharks (*Sphyrna* spp.) off Australia. *Acta Parasitologica, in press*

New species: *Piscicapillaria bursata*

Abstract: Purpose Data on helminth parasites in hammerhead sharks are scarce and, therefore, new examinations of these hosts are needed to recognize the species composition of their parasites, including nematodes. Methods Helminthological examinations of hammerhead sharks, *Sphyrna lewini* (Griffith et Smith) (209 specimens) and *Sphyrna mokarran* (Rüppell) (57 specimens) (Sphyrnidae, Carcharhiniformes), from off the northern coast of Australia revealed one new and one insufficiently known species of intestinal nematode parasites. These were studied with the use of light and scanning electron microscopy. Results Both nematode species are described. *Piscicapillaria bursata* sp. nov. (Capillariidae) from *S. mokarran* (type host) and *S. lewini* differs from its congeners mainly in the spicule length (330 µm), body length of gravid females 12.80–21.26 mm and in possessing a subterminal female anus. The specimens of *Parascarophis sphyrnae* Campana-Rouget, 1955 (Cystidicolidae) (type species of *Parascarophis* Campana-Rouget, 1955) collected from *S. lewini* made it possible to redescribe the female and, for the first time, to describe the male; the same species was also found in *S. mokarran*. Amended diagnosis of *Parascarophis* is provided. *Parascarophis* is mainly characterized by the presence of lateral alae, a unique feature within the Cystidicolidae, and by the cephalic structures (presence of a cuticular hood and a pair of anterolateral plate-like structures in the mouth). Conclusions In addition to the discovery of a new nematode species, *Pi. bursata* sp. nov., the finding of *Pa. sphyrnae* in Australian waters represents a new geographical record of this parasite outside the Atlantic Ocean. The species of *Parascarophis* previously described from teleosts, *P. bharatii* Agrawal, 1965, P. oteroi Arya, 1992 and *P. mulloidi* Imam, Tawfik et Abdel Hady, 1982, are designated as species inquirendae and incertae sedis. The finding of *P. sphyrnae* in Australian waters represents a new geographical record of this parasite outside the Atlantic Ocean. *Pa. sphyrnae* had not been reported previously from beyond the Atlantic Ocean.



TOMIKAWA, K. & YANAGISAWA, M. & HIGASHIJI, T. & YANO, N. & VADER, W. (2019): A New Species of *Podocerus* (Crustacea: Amphipoda: Podoceridae) Associated with the Whale Shark *Rhincodon typus*. *Species Diversity, 24 (2): 209–216*

New species: *Podocerus jinbe*

Abstract: A new species of podocerid amphipod, *Podocerus jinbe*, is named and described. This new species was collected from the gill rakers of the whale shark *Rhincodon typus* Smith, 1828 from off Yomitan Village, Okinawa Island, Japan. This is the first record of an amphipod associated with the whale shark. *Podocerus jinbe* sp. nov. is morphologically similar to *P. zeylanicus* (Walker, 1904), but differs from the latter by its larger body size, shorter peduncular article 1 of antenna 1, longer flagellar article 1 of antenna 1, subrectangular propodus of male gnathopod 1, anteriorly concave basis of male gnathopod 2, narrow merus of female gnathopod 2, greater number of robust setae on rami of uropods 1 and 2, and greater number of long robust setae on the telson apical lobe. Additionally, a partial DNA sequence of the mitochondrial cytochrome *c* oxidase subunit I (COI) of this species was determined for future studies.

RUIZ, C.K. & BULLARD, S.A. (2019): A new species of parasitic copepod (Siphonostomatoida: Lernaeopodidae: *Neoalbionella* Ozdikmen, 2008) infecting the skin of a gulper shark, *Centrophorus* sp. (Squaliformes: Centrophoridae), in the Gulf of Mexico, with a key to species of *Neoalbionella*. *Journal of Crustacean Biology, 39 (4): 459-467*

New species: *Neoalbionella dannytangi*

Abstract: We describe male and female specimens of a species of *Neoalbionella*Özdikmen, 2008 (Siphonostomatoida, Lernaeopodidae), *Neoalbionella dannytangi***sp. nov.**, infecting the skin of a gulper shark *Centrophorus* sp. (Centrophoridae) in the northern Gulf of Mexico. Females of the new species most closely resemble those of *Neoalbionella globosa* (Leigh-Sharpe, 1918) but are unique among congeners by having the combination of 1) terminal endopodal segment of antenna with a reduced distal tubercle having a minute protuberance, 2) maxillule with a spinulose lateral palp and praecoxal endite, 3) maxilla with a swollen tip nearly parallel with the distal surface of the bulla, and 4) maxilliped with a sub-circular spinulose pad along the proximal myxal margin of the corpus maxillipedis. The male copepod was attached to the tip of a female's posterior process and was assigned to *Neoalbionella* by having a cephalosome nearly equal in length to the trunk and tapered caudal rami directed posteroventrally (swollen and directed anterodorsally in males of *Lernaeopoda* von Nordmann, 1832). It was distinct from those of all other congeners by having 1) an antenna terminal endopodal segment and maxillule similar to that of the female, 2) a maxilla syncoxa with an anteromedial process having seven large, conical denticles, 4) a bifid mediative process approximately as wide as the length of the shortest lobe, and 5) a caudal ramus with a unique configuration and number of setae. This is the second report of a species of *Neoalbionella* from the Gulf of Mexico and the third nominal species of

Neoalbionella reported from gulper sharks (*Centrophorus* spp.). We also provide keys to females and males of *Neoalbionella*.

IRIGOITIA, M.M. & BRAICOVICH, P.E. & ROSSIN, M.A. & CANEL, D. & LEVY, E. & FARBER, M.D. & TIMI, J.T. (2019): Diversity of *Empruthotrema* Johnston and Tiegs, 1992 parasitizing batoids (Chondrichthyes: Rajiformes and Myliobatiformes) from the Southwest Atlantic Ocean, with description of three new species. *Parasitology Research, 118 (11): 3113-3127*

New species: *Empruthotrema aoneken, Empruthotrema orashken, Empruthotrema dorae*

Abstract: During an extensive research project involving 519 specimens of batoids, including 13 species of Rajiformes and Myliobatiformes (Chondrichthyes) from the Argentine Sea, three new species of *Empruthotrema* were found and are described using morphologic characteristics and two molecular markers: LSU rDNA and COI mtDNA. The new species can be distinguished from their congeners by the number and distribution of the marginal loculi, the length and morphology of male copulatory organ, and the presence of eyespots. Additionally, multivariate analysis identified the dimensions of the pharynx and ejaculatory bulb as diagnostic features. Host specificity and previous records of the genus in the region are discussed. This is the first description of new species in this genus for the Southwestern Atlantic Ocean, as well as for arhynchobatid hosts.

MORALES-SERNA, F.N. & CROW, G.L. & MONTES, M.M. & GONZALEZ, M.T. (2019): Description of *Echthrogaleus spinulus* n. sp. (Copepoda: Pandaridae) parasitic on a torpedo ray from the central Pacific Ocean utilising a morphological and molecular approach. *Systematic Parasitology, 96 (9): 777–788*

New species: *Echthrogaleus spinulus*

Abstract: A new species of parasitic copepod, *Echthrogaleus spinulus* n. sp. (Pandaridae), is described from the torpedo ray *Tetronarce tokionis* (Tanaka) (Torpedinidae) captured in pelagic Hawaiian waters. The new species has pediger 4 bearing large dorsal plates with denticles on posterior margin, genital complex with posterolateral lobes widely curved medially and overlapping, leg 4 exopod incompletely 3-segmented, and the largest body size (maximum length 16 mm from anterior rim of frontal plates to tip of caudal rami, excluding setae). This morphology does not match any of the seven valid species of *Echthrogaleus* Steenstrup & Lütken, 1861. Analysis of 28S rDNA sequences separated the new material from the Central Pacific from samples of *E. coleoptratus* in the Atlantic and Eastern Pacific Oceans. However, due to the lack of DNA sequences in the databases, the new 28S rDNA sequence cannot used to confirm the species identity. The unique morphological characteristics of the Central Pacific female copepods combined with 28S rDNA sequencing was used as a basis to validate the new species.

NACARI, L.A. & SEPULVEDA, F.A. & ESCRIBANO, R. & OLIVA, M.E. (2019): Two new species of *Acanthocotyle* Monticelli, 1888 (Monogenea: Acanthocotylidae), parasites of two deep-sea skates (Elasmobranchii: Rajiformes) in the South-East Pacific. *Parasites & Vectors, 12 (1): 512*

New species: *Acanthocotyle imo, Acanthocotyle atacamensis*

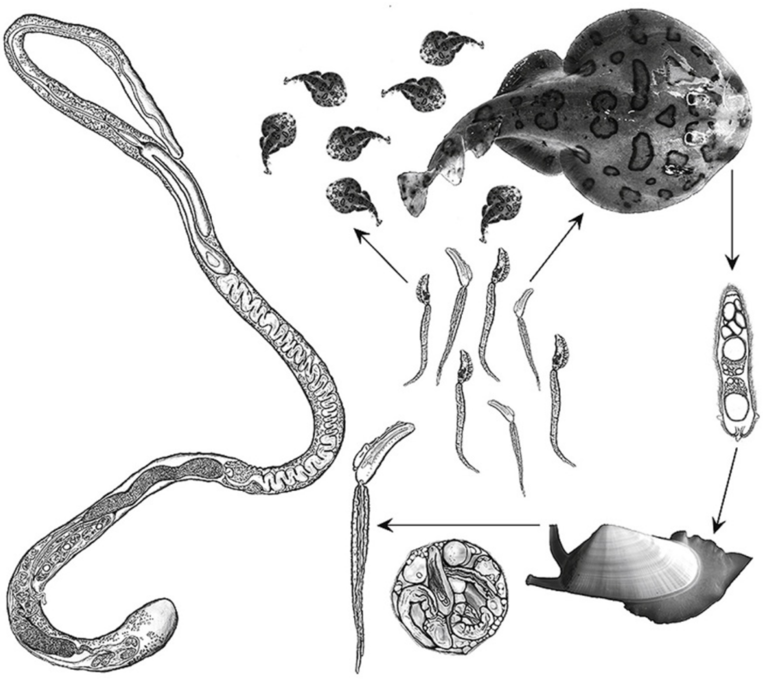
Abstract: Background: Parasites of deep-sea fshes from the South-East Pacifc (SPO) are poorly known. Of c.1030 species of fsh found in this area, 100–150 inhabit the deep-sea (deeper than 200 m). Only six articles concerning metazoan parasites of fsh from deep-waters of SOP are known, and nine monogenean species have been reported. Currently, ten species are known in *Acanthocotyle* Monticelli, 1888 (Monogenea) and when stated, all of them are found in shallow waters (10–100 m). *Acanthocotyle gurgesiella* Ñacari, Sepulveda, Escribano & Oliva, 2018 is the only known species parasitizing deep-sea skates (350–450 m) in the SPO. The aim of this study was the description of two new species of *Acanthocotyle* from two Rajiformes. Methods: In September 2017, we examined specimens of two species of deep-sea skates (Rajiformes), *Amblyraja frerichsi* (Kreft) and *Bathyraja peruana* McEachran & Myyake, caught at c.1500 m depth of Tocopilla, northern Chile, as a by-catch of the Patagonian tooth fsh Dissostichus eleginoides Smitt fshery. Specimens of *Acanthocotyle*

were collected from the skin of the skates. Morphometric (including multivariate analysis of proportional measurements, standardized by total length), morphological and molecular analyses (LSU rRNA and cox1 genes) were performed in order to identify the collected specimens. Results: The three approaches used in this study strongly suggest the presence of two new species in the genus *Acanthocotyle*: *Acanthocotyle imo* n. sp. and *Acanthocotyle atacamensis* n. sp. parasitizing the skin of the thickbody skate *Amblyraja frerichsi* and the Peruvian skate *Bathyraja peruana*, respectively. The main morphological diferences from the closely related species *Acanthocotyle verrilli* Goto, 1899 include the number of radial rows of sclerites, the non-discrete vitelline follicles and the number of testes. Conclusions: The two species of monogeneans described here are the only recorded parasites from their respective host species in the SPO. Assessing host specifcity for members of *Acanthocotyle* requires clarifying the systematics of Rajiformes.

PALM, H.W. & PALM, N. & HASELI, M. (2019): Tentaculariid trypanorhynchs (Platyhelminthes: Cestoda) from *Mobula japanica* (Muller & Henle) from Indonesia, with the description of two new species. *Parasitology Research, in press*

New species: *Nybelinia balinensis, Nybelinia mobulicola*

Abstract: This study presents new information on tentaculariid trypanorhynchs from the Indo-Pacific region around Bali, Indonesia. Two new tentaculariid species, *Nybelinia balinensis* n. sp. and *N*. *mobulicola* n. sp., are described from the stomach of their myliobatid host *Mobula japanica* (Müller & Henle). *Nybelinia balinensis* n. sp. is a large-sized tentaculariid (scolex length, 6766–10,991). It can be distinguished from its congeners by a falcate metabasal armature, a unique basal armature of four rows of triangular shaped hooks, craspedote proglottids, and testes arranged in multiple layers in two separate lateral fields. *N. mobulicola* n. sp. can be characterized by short tentacles of 25 rows of hooks and 60 testes not reaching posterior to the ovary. A combination of a shorter basal armature of uncinate hooks without anterior extension of the base and fewer metabasal uncinate hooks with anterior extension of the base distinguishes it from *N. lingualis* (Cuvier, 1817). It differs from *N. balinensis* n. sp. in the possession of uncinate rather triangular shaped basal hooks. The *Nybelinia* Poche, 1926 fauna of *M. japanica* is highly specific, in line with a unique trypanorhynch fauna earlier described for the devil rays. This reflects their unique position as oceanic plankton feeders within the marine food web.



WARREN, M.B. & BULLARD, S.A. (2019): First elucidation of a blood fluke (*Electrovermis zappum* n. gen., n. sp.) life cycle including a chondrichthyan or bivalve. *International Journal for Parasitology: Parasites and Wildlife, 10: 170-183*

New species: *Electrovermis zappum*

Abstract: We describe a new fish blood fluke (Digenea: Aporocotylidae: *Electrovermis zappum* n. gen., n. sp.) and its life cycle in the intertidal zone adjacent to Mobile Bay (north-central Gulf of Mexico). This is the first elucidated aporocotylid life cycle that includes a chondrichthyan definitive host or a bivalve intermediate host. The new species undergoes asexual reproduction within the gonad of the variable coquina clam before maturing in the heart of the lesser electric ray. These adults and cercariae had identical 28S, 18S, and ITS2 nucleotide sequences. The new genus is similar to *Ogawaia* Cutmor et al., 2018 by having an inverse U-shaped intestine, a looping testis, and a uterus having distinct ascending and descending segments. It differs by having a body that is ≥ 30 × longer than wide, a testis with >30 curves, an obvious cirrus sac enveloping an extremely elongate cirrus, an ovary anterior to the seminal vesicle, and a post-gonadal uterus. The new species further differs from the type species of *Ogawaia* (*Ogawaia glaucostegi* Cutmore et al., 2018) by having a massive seminal vesicle (>10% of body length), a cirrus sac enveloping an extremely elongate cirrus, and a slightly sinuous uterus. Histology confirmed gametogenesis in an infected coquina clam but no discernible cellular response to infection was observed. We also i) characterize a second morphologically and genetically distinct cercaria (perhaps representing an innominate chondrichthyan aporocotylid) infecting the green jackknife clam in Mississippi Sound (north-central Gulf of Mexico), ii) compare all known aporocotylid cercariae infecting estuarine and marine mollusks and polychaetes and iii) provide a key to identify those cercariae. A phylogenetic analysis including nucleotide sequences from adult and cercarial specimens of the newly collected fish blood flukes further supports the notion that chondrichthyan aporocotylids are monophyletic and use bivalves as the first intermediate host; perhaps unlike any other blood fluke lineage.

ÑACARI, L.A. & SEPULVEDA, F.A. & DROGUET, F. & ESCRIBANO, R. & OLIVA, M.E. (2019): *Calicotyle hydrolagi* n. sp. (Monogenea: Monocotylidae) infecting the deep-sea Eastern Pacific black ghost shark *Hydrolagus melanophasma* from the Atacama Trench, with comments on host specificity of *Calicotyle* spp. *Parasitology International, 75: 102025*

New species: *Calicotyle hydrolagi*

Abstract: We describe *Calicotyle hydrolagi* n. sp. (Monogenea: Monocotylidae) infecting the cloaca of deep-water Eastern Pacific black ghost sharks, *Hydrolagus melanophasma* captured as bycatch at a local fishery for Patagonian toothfish *Dissostichus eleginoides*, (Nototheniidae) in the Atacama Trench using morphological and nucleotide (LSU rRNA and SSU rRNA) data. This new species is differentiated from its congeners by a number of characters, including the absence of a cecal diverticula, the size and shape of the male copulatory organ and the shape of the vagina, as well as by differences in molecular data (SSU rRNA and LSU rRNA). The suitability of some sclerotized structures such as the male copulatory organ (MCO) as a taxonomic character is discussed; specifically, we found that the relationship between MCO and total length exhibit different trends in members of *Calicotyle* isolated from sharks, skates and chimaeras. Additional efforts to obtain sample of *Calicotyle* species and further molecular studies based on ribosomal and mitochondrial genes are necessary to clarify the degree of host specificity in this genus. Additionally, this is the first report of a member of *Calicotyle* to be reported in the Southeastern Pacific Ocean.

3.5 Distribution

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