New records of nine fish species from the East Vietnam Sea

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Abstract. This study was conducted on several islands in the waters of Vietnam with the purpose of assessing and describing the biodiversity of coral reef fish in this region. 548 species belonging to 248 genera and 82 families of coral reef fish were recorded. The current article describes nine newly recorded species in the east Vietnam Sea, including: *Pleurosicya elongata* Larson 1990; *Ctenogobiops tangaroai* Lubbock & Polunin 1977; *Eviota nigriventris* Giltay 1933; *Pogonoperca punctata* (Valenciennes 1830); *Pseudojuloides splendens* Victor 2017; *Hoplolatilus starcki* Randall & Dooley 1974; *Nemateleotris decora* Randall & Allen 1973; *Centropyge colini* Smith-Vaniz & Randall 1974; *Genicanthus bellus* Randall 1975. Furthermore, the article presents the first documented instances of rare coral reef fish species in Vietnam's waters, found at depths exceeding 30 m, using high-quality images.
Key Words: biodiversity, coral reef, coral reef fish, South China Sea.

Introduction. Coral reef fish are one of the focal groups for research due to their crucial role in marine food chains and significant economic importance for humans. Being situated near the Coral Triangle, a center of marine biodiversity in the world, the South China Sea region, including the coastal waters of Vietnam, has been subject to numerous studies concerning coral reef fish species. Notably, Randall & Lim (2000) identified 3365 marine fish species in the South China Sea (East Sea), with over one-third being coral reef fish. Thi & Quan (2005) published a catalog of 1206 coral reef fish species in the coastal waters of Vietnam, representing 451 genera and 118 families. Furthermore, Nguyen & Mai (2020) compiled and updated a list of 1049 coral reef fish species in the nearshore waters of Vietnam. Until now, the investigation of coral reef fish species in the Vietnamese coastal waters is an ongoing endeavor, but it faces challenges due to geographical constraints and conditions, especially in conducting research in offshore areas. Studying and accessing offshore and nearshore regions of Vietnam will provide valuable new data on the composition of fish species in this area. During the research conducted in these offshore and nearshore regions, 548 coral reef fish species were recorded, including 9 newly identified species for the east Vietnam sea. Additionally, small-sized Gobiidae fish species have also been documented in the area.

Material and Method

Description of the study sites. The Vietnamese waters are situated within the tropical monsoon region, stretching over 3200 km, enveloping the eastern coastline from Mong Cai (Quang Ninh province) to Ha Tien (Kien Giang province). Coral reefs are distributed along most coastal areas and offshore islands from north to south. Within this maritime expanse, there are approximately 3000 islands of varying sizes scattered throughout (Thi & Quan 2005).

The Spratly Archipelago (6°30’-12°00N and 111°20’-117°20’E) is a large coral archipelago located in the central and southern parts of the East Sea (South China Sea). It is surrounded by significant depths and lies near the center of the coral triangle (Hoeksema 2007), with around 130 islands, shoals, and submerged banks spread across an area of approximately 180000 km². The seawater is characterized by low turbidity,

high salinity, and stability, resembling the typical characteristics of saline marine water. The average temperature ranges from 24.5°C to 35.5°C (Thung et al 2014). Among these, we conducted research on 6 island locations from north to south: 1) Southwest Cay (Song Tu Tay) (11°25.79'N and 114°19'E), which is elliptical in shape and covers an area of approximately 0.275 km²; 2) South Reef (Da Nam) (11°23.32'N and 114°17.8'E), located about 3.5 nautical miles from Southwest Cay, with a length of 2.88 km and width of 1.95 km; 3) Namyit Island (Nam Yet) (10°10.79'N and 114°21.9'E), with an area of 0.104 km², oval in shape, slightly narrow horizontally, extending east-west for about 650 m, and approximately 170 m wide; 4) Discovery Great Reef (Da Lon) (10°03.7'N and 113°51.1'E), 15 km long and averaging 2 km wide, covering an area of about 28.5 km²; 5) Alison Reef (Toc Tan) (08°48.7'N and 113°59.0'E), approximately 18.95 km long, about 6.28 km wide, with an average area of 74.52 km²; 6) Barque Canada Reef (Thuyen Chai) (08°11'N and 113°18.6'E), running in a southeast to northwest direction, approximately 27.9 km long and about 3.82 km wide.

The Cat Ba Archipelago (20°42'-20°54'N, 106°52'-107°07'E) is located in the northeastern part of Vietnam, belonging to Hai Phong city. It covers an approximate area of nearly 300 km², comprising nearly 400 small and large islands. The average temperature ranges from 21°C to 31°C. Annual rainfall varies from 1711 to 3076 mm. The coral reefs cover an area of approximately 250 ha. Due to the steep slope of the coastal terrain and the presence of muddy bottoms near the shores, coral reefs are typically found in narrow, common strips at depths of 5-6 m, with a maximum depth of no more than 10 m. In the Cat Ba Archipelago, a total of 2386 species of terrestrial and aquatic organisms have been recorded (Thanh et al 2015).

The Tho Chu Island is located in the southwestern part of Vietnam, near the center of the Gulf of Thailand, approximately 100 km southwest of Phu Quoc Island. It encompasses a total area of 13.7 km² and consists of 8 islands: Tho Chu Island, Tu Islet, Nhan Islet, Kho Islet, Cao Cat Islet, Xanh Islet, Cao Islet, and Cai Ban Islet. The climate is warm throughout the year, with an average annual temperature of 27.2°C. Average annual rainfall is 3001 mm. The waters surrounding the Tho Chu Island extend to a depth of 30 m, covering an area of approximately 4427.4 ha. The seabed terrain near the coastline is typically steep, gradually leveling off to depths of 20-30 m (Ve et al 2018).

Sampling methods, preparation and examination of samples. The field surveys and sampling were conducted between 2020 and 2022 at various island locations in the coastal waters of Vietnam. These locations include Cat Ba Archipelago, Tho Chu Island, and six islands within the Spratly Archipelago (Truong Sa Archipelago): Namyit Island (Nam Yet), Alison Reef (Toc Tan), Barque Canada Reef (Thuyen Chai), Southwest Cay (Song Tu Tay), South Reef (Da Nam), and Discovery Great Reef (Da Lon) (Figure 1). The specific survey periods are as follows:

Year 2020: Cat Ba (May-June 2020), Tho Chu (November 2020).

Year 2021: Spratly Archipelago (March-May 2021 and September-October 2021), Cat Ba (November 2021).

Year 2022: Tho Chu (March-April 2022), Cat Ba (May 2022), and Spratly Archipelago (July-August 2022).

The study employed SCUBA diving and direct observation following the guidelines outlined in English et al (1997). Additionally, high-quality visual documentation was achieved using underwater photography and videography equipment, including Nikon D810 with Nikon 105 mm Macro Lens and Nikon 60 mm Macro Lens, Selux 800 underwater lighting system, Canon 70D with Canon lens 17-40 mm, Ikelite underwater housing, Nikon W300, and GoPro 7. These devices were used to capture images and videos of the marine specimens. Some fish samples were also collected using angling, underwater nets, and obtained from local fishermen and fish markets. The freshly collected fish specimens were photographed and then preserved in 5% formalin solution before being transferred to a 70% ethanol solution for storage at the joint Vietnam-Russia tropical science and technology research center laboratory.

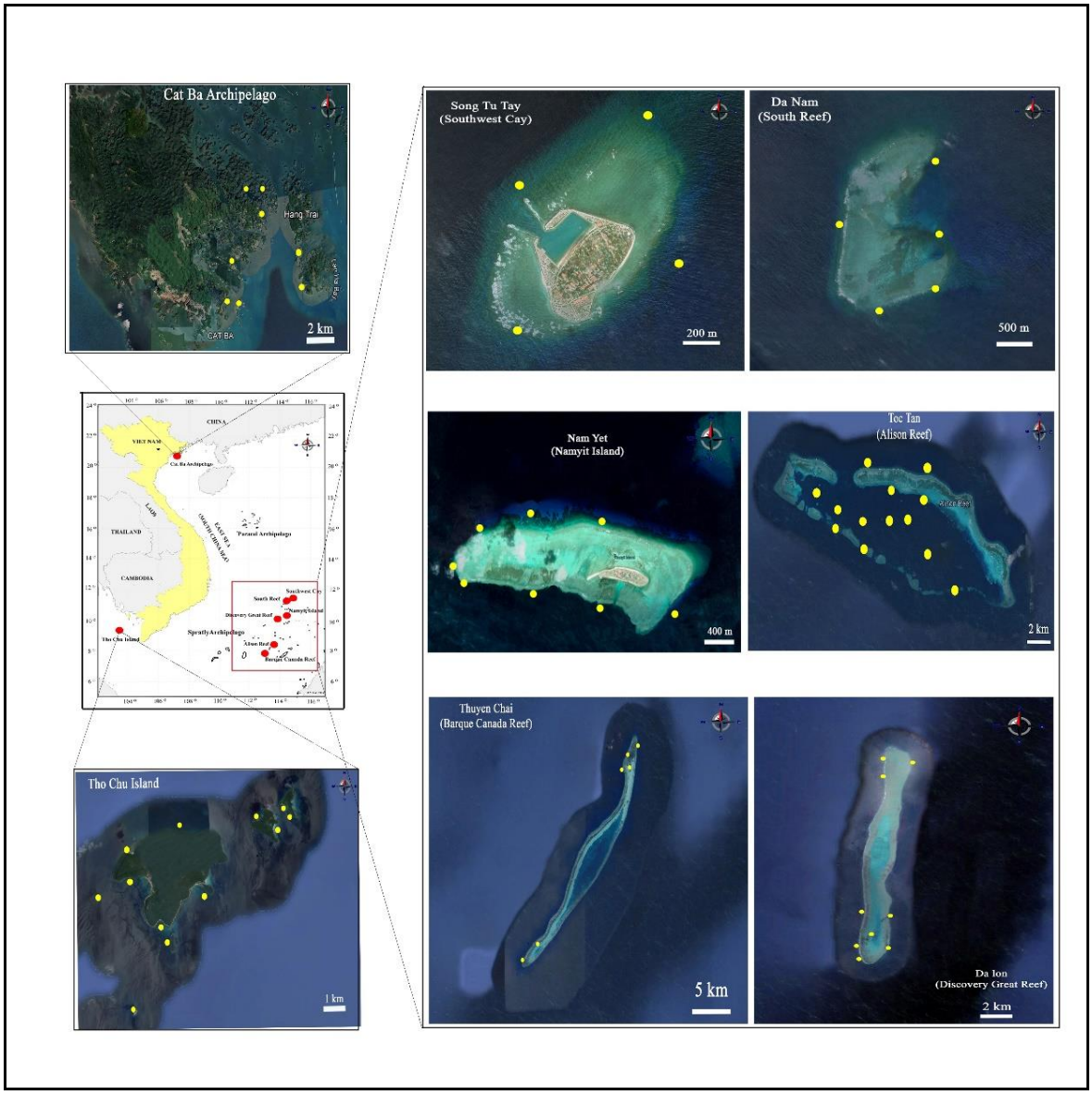

Figure 1. The map of the sampling points at Cat Ba Archipelago, Tho Chu Island, and the Spratly Archipelago.

Fish identification. The materials collected were later categorized and identified using identification keys from various literature sources, such as Lieske & Myers (2001), Nakabo (2002), Allen et al (2003), and Kimura et al (2018). The scientific names and taxonomic classification of the species were updated and organized according to Van der Laan et al (2023). Abbreviations used in the article include: D - dorsal fin rays; A - anal fin rays; LL - lateral line scale count. The recorded species composition data was compared with previous research results from Randall & Lim (2000), Thi & Quan (2005), and Nguyen & Mai (2020) to evaluate the newly recorded species in the study. The conservation status was determined from the IUCN Redlist of Threatened Species.

Data analysis. Data processing and calculations were conducted using Excel 2016 and Primer 6.0 software for similarity analysis (Cluster analysis).

Results

Family Gobiidae
Genus *Pleurosicya*
Pleurosicya elongata Larson 1990 (Figure 2A)

New records. Vietnam. Spratly Archipelago, Alison Reef; 8°46’38.32”N, 114°01’22.58”E; 12 m depth; 16.08.2022; collector: Savinkin O.V obs.; found on coral reefs, on sponges; the color is sometimes the same as the sponge; unsexed; retention code: 810_0862.
Identification. The anatomical characters of the fish are characterized by an elongated body, possessing a translucent hue adorned with diminutive ebony speckles, reminiscent of the intricate patterns found upon a sponge's surface. Notably, the dorsal aspect of the creature exhibits cocoa-hued streaks tracing the vertebral column, whilst vermilion stripes extend from the ocular region to the oral apex. Occasional mimicry of the surrounding living sponge's chromatic palette renders detection a challenging endeavor. The species' geographical range spans the Indo-West Pacific expanse, spanning from the Maldives to the territorial waters of Indonesia and Papua New Guinea (Kailola 1991; Kuiter 1992; Anderson et al 1998). A rigorous analysis and comparison of contemporary and previously published scholarly works within the South China Sea and the maritime domain of Vietnam buttress the significance of the recent taxonomic identification. Consequently, this pioneering finding firmly establishes the inaugural and official occurrence record of the species within the surveyed area.

Family Gobiidae
Genus *Eviota*
Eviota nigriventris Giltay 1933 (Figure 2B)

New records. Vietnam. Spratly Archipelago, Alison Reef; 8°47’26.12”N, 114°00’21.71”E; 10m depth; 05.08.2022; collector: Savinkin O.V obs.; the species was encountered living within the branches of hard coral Acropora, unsexed, retention code: 810_9591, 810_9592, 810_9593.
Identification. A wide red stripe covers the majority of the head and extends downwards along the lower body, concluding at the base of the tail fin with a semicircular black spot. From the tip of the snout, a white line traverses the area between the eyes, extending upwards over the head and trailing all the way to the caudal fin, where it curves downward, following the contour of the angled black spot. There is a similar but shorter white stripe across the eye, extending above the membrane in front of the gill cover. The underside of the head, the belly and the dorsal side are white. Eye's pupil is black, iris is the same red as the red stripe on the body. Worldwide, the species is known from the Yaeyama Islands, Japan, the Philippine Islands, Palau, Bali, Flores, Kimbe Bay, New England, Papua New Guinea, and Chesterfield Islands (Greenfield & Randall 2011). Previously, the species was known to inhabit various regions around the South China Sea, such as Indonesia (Kuiter & Tonozuka 2001), and the Philippine Archipelago (Greenfield & Randall 2011). However, there has been no published documentation of its presence in the waters of the South China Sea and the maritime territory of Vietnam. The current study confirms the species' distribution in the the East Vietnam Sea.

Family Labridae
Genus *Pseudojuloides*
Pseudojuloides splendens Victor 2017 (Figure 2C)

New records. Vietnam. Spratly Archipelago, Alison Reef; 8°48’46.74”N, 113°56’29.10”E; 25 m depth; 13.08.2022; collector: Savinkin O.V obs.; encountered on coral reefs; male; retention code: 810_0505, 810_0507, 810_0508, 810_0509, 810_0510.
Identification. The upper part of the body displays a verdant green hue, while the lower section adopts a cerulean blue shade. Along the midsection, there are distinctive yellow and azure stripes running longitudinally along the body. Behind the eye, two extended

azure stripes traverse through the gill covers, accompanied by a strip of golden-brown that runs from the mouth upwards to the crown of the head. The tail fin exhibits a crescent-shaped black mark bordered by a sapphire blue rim. Distinguishing it from the *P. cerasinus* species, which only features a single azure stripe on its flank, *P. splendens* showcases two such stripes (Victor 2017). This species is widespread in tropical and subtropical regions of the western Pacific Ocean (Parenti & Randall 2018). Presently, the research confirms the distribution of the *P. splendens* species in the East Vietnam Sea.

Family Pomacanthidae
Genus *Centropyge*
Centropyge colini Smith-Vaniz & Randall 1974 (Figure 2D)

New records. Vietnam. Spratly Archipelago, Alison Reef; 8°50’15.70”N, 113°55’59.85”E; 8°48’40,02”N, 113°59’04,44”E; 45-65 m depth; 14-15.08.2022; collector: Savinkin O.V obs.; encountered on the reef slopes; unsexed; retention code: 810_0804, 810_0807, 810_0649.
Identification. D: XIV 16; LL: 47. The body displays a lemon-yellow hue on its underside, while the upper back, dorsal fin, and the area around the eyes are adorned with a verdant green color. Along the gill cover, there is a prominent elongated spine. Globally, this species has been recorded in the Indian Ocean-Western Pacific region, including Cocos-Keeling coral atoll, parts of Indonesia, Palau (Belau), Guam, Fiji, and the Marshall Islands, Indonesia (Pyle 2001). However, its presence has not been documented in the waters of the South China Sea and the maritime territory of Vietnam. The current study confirms the distribution of this species in the East Vietnam Sea.

Family Pomacanthidae
Genus *Genicanthus*
Genicanthus bellus Randall 1975 (Figure 2E)

New records. Vietnam. Spratly Archipelago, Alison Reef; 8°50’13.25”N, 113°57’31.49”E; 30-35 m depth; 13.08.2022; collector: Savinkin O.V obs.; found on the slopes and hollows of coral reefs; male; retention code: 810_0360, 810_0362. Spratly Archipelago, Discovery Great Reef; 10°00’10,44”N, 113°50’29,90”E; 40 m depth; 19.10.2021; collector: Savinkin O.V obs.; found on the slopes and hollows of coral reefs; female; retention code: 810_6189, 810_6191, 810_6193, 810_6197.
Identification. D: XV 15; A: III 16. In males, the body is pale gray with midsection yellow stripes. The dorsal fin has a yellow stripe at its base and a blue rim. The elongated tail fin is delicate, with blue edges flanking a central yellow portion adorned with intricate patterns. Females feature a white body with a notable black stripe from the gill cover to caudal peduncle, accompanied by a greenish stripe underneath. A black stripe crosses the head, passing through the eye. The dorsal fin is black with red edges, and the elongated tail fin displays dual black stripes along its edges. This species is noted in the Indian and Pacific Oceans: the Cocos-Keeling Islands, Philippines, Palau, Guam, Cook Islands, and the Society Islands và Tonga (Randall et al 2003; www.fishbase.se), but unrecorded in the South China Sea and Vietnamese waters. This study confirms its presence in both regions.

Family Microdesmidae
Genus Nemateleotris
Nemateleotris decora Randall & Allen 1973 (Figure 2F)

New records. Vietnam. Spratly Archipelago, Alison Reef; 8°50’13.25”N, 113°57’31.49”E; 8°48’40.02”N, 113°59’04.44”E; 12 m depth; 13-15.08.2022; collectors: Savinkin O.V, Tran V.D obs.; encountered on coral reefs; unsexed; retention code: 810_0367, 810_0777, 810_0794. Spratly Archipelago, Barque Canada Reef; 8°16’51.90”N 113°21’49.94”E; 16 m depth; 01.05.2021; collector: Savinkin O.V obs.; found on the rock bottom, crushed coral; unsexed; retention code: 810_8063.

Identification. The body exhibits a light yellow shade at the front, gradually deepening to a purple hue towards the rear. A violet stripe runs across the head from the mouth to the dorsal fin, forming a triangular pattern ending in a dot. Pelvic, anal, and dorsal fins range from violet to red, sometimes with a bold blue edge. The tail fin is violet with two broad red bands. Typically seen in pairs, this species is documented globally from the Indian Ocean to the Pacific. Randall & Lim (2000) also recorded it in the South China Sea. This study confirms its presence in Vietnamese waters.

Family Malacanthidae
Genus *Hoplolatilus*
Hoplolatilus starcki Randall & Dooley 1974 (Figure 2G)

New records. Vietnam. Spratly Archipelago, Discovery Great Reef; 9°59’47.22”N, 113°50’37.86”E; 12 m depth; 03.08.2022; collector: Savinkin O.V obs.; encountered on the reef slopes unsexed; retention code: 810_8987, 810_8988. Spratly Archipelago, Southwest Cay; 11°25’35.22”N, 114°19’43.97”E; 25 m depth; 21.10.2021; collector: Savinkin O.V obs.; encountered on coral reefs; unsexed; retention code: 810_7113, 810_7114, 810_7115, 810_7116.
Identification. The elongated body is slender and light yellow in color. The head to the base of the pectoral fin is adorned with a blue-green hue, while the tail fin is yellow. This species is documented in the Indian and Pacific Oceans, in areas including Bali, Indonesia, from the Philippines to Timor, north to the Mariana Islands, south to Rowley Shoals and New Caledonia, Micronesia (www.fishbase.se). Its presence has also been recorded in the South China Sea by Randall & Lim (2000). The current study confirms the distribution of this species in Vietnamese waters.

Family Gobiidae
Genus *Ctenogobiops*
Ctenogobiops tangaroai Lubbock & Polunin 1977 (Figure 2H)

New records. Vietnam. Spratly Archipelago, Alison Reef; 8°46’38.32”N, 114°01’22.58”E; 10-15 m depth; 16.08.2022; collector: Savinkin O.V obs.; found on the sandy bottom of the rocks around the coral reefs; unsexed; retention code: 810_0889.
Identification. D: VIII 11; A: I 11. The body is characterized by a translucent light gray hue, featuring a row of five orange-yellow spots along the midsection, each nearly as large as the pupil. There are orange-yellow spots, white spots, and a scattering of pale blue dots distributed across the body. Cheek and opercle display small dark-edged orange-yellow spots. The membrane between the first and second dorsal fin rays is dark brown and much longer than the other rays. Notably, a lengthy narrow white streak adorns the lower third of the pectoral fins, differing from the white spot or short dash observed in other species within the same genus. Globally, the species *C. tangaroai* is distributed in the Western Pacific region (Kuiter & Tonozuka 2001). It was previously documented in the South China Sea by Randall & Lim (2000). However, its presence has not been mentioned in the maritime waters of Vietnam.

Family Grammistidae
Genus *Pogonoperca*
Pogonoperca punctata (Valenciennes 1830) (Figure 2I)

New records. Vietnam. Spratly Archipelago, Discovery Great Reef; 10°06’57.12”N, 113°52’08.71”E; 30 m depth; 02.08.2022; collector: Savinkin O.V obs.; Encountered on sandy substrates and amidst rocky debris around coral reefs, this species does not exhibit sexual dimorphism; unsexed; retention code: 810_8588, 810_8589.
Identification. D: VII 13; A: III 8. The body is gray with numerous small white circular spots scattered all over. The fins are transparent. At the head's apex and along the dorsal region, there are distinctive black horse-shoe markings, including one that crosses through the eye. Additionally, black dots are present at the tail margin and the base of

the anal fin. The species *P. punctata* shares several characteristics with the previously recorded *P. ocellata* in Vietnam. However, *P. punctata's* fins are transparent, while in *P. ocellata*, the fins usually bear multiple white spots. Moreover, the white spots on the body of *P. ocellata* are smaller and denser compared to *P. punctata* (Randall & Schraml 2010). *P. punctata* is widely distributed in the Pacific Ocean and the Indian Ocean. It recently has been newly discovered in southern Natal, South Africa (Kuiter & Tonozuka 2001). Its presence in the South China Sea has also been documented by Randall & Lim (2000). The current study confirms the distribution of this species in the maritime waters of Vietnam.

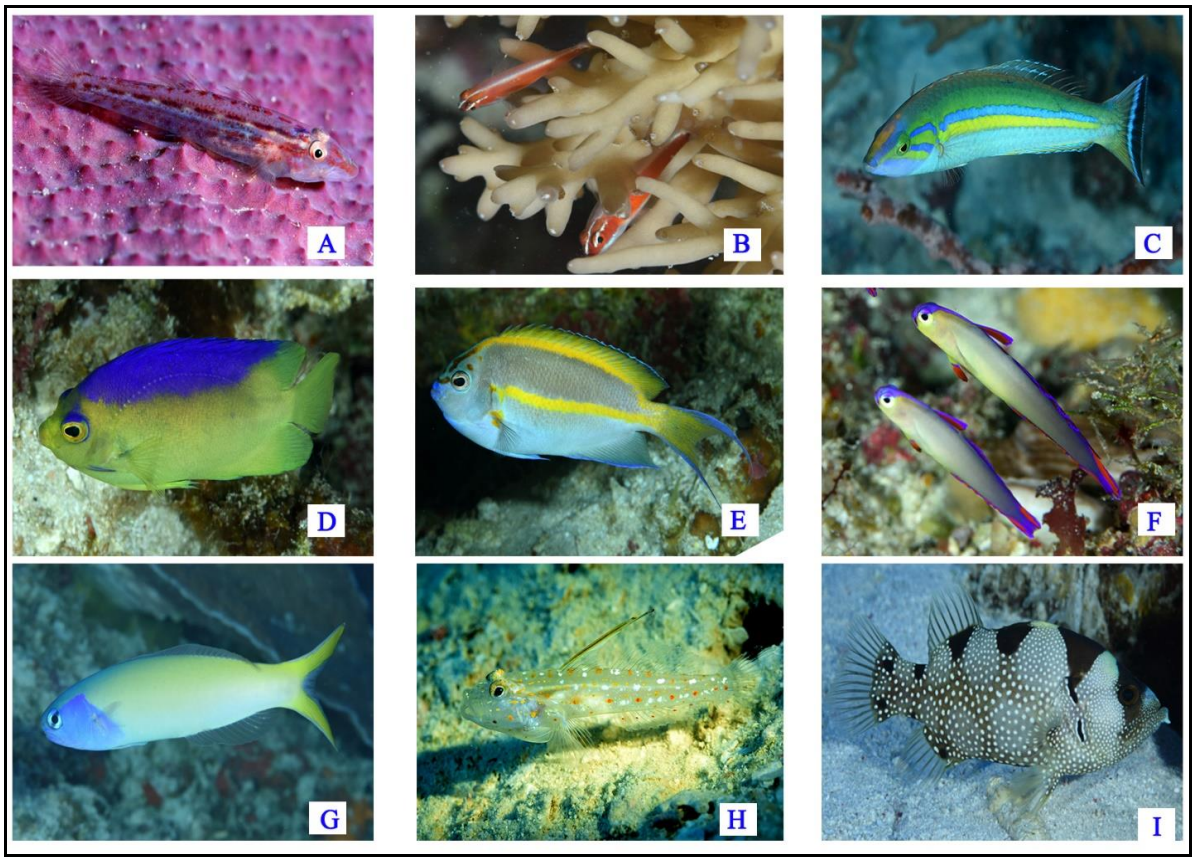

Figure 2. Newly recorded species for the east Vietnam sea (A. *Pleurosicya elongata*; B. *Eviota nigriventris*; C. *Pseudojuloides splendens*; D. *Centropyge colini*; E. *Genicanthus bellus*; F. *Nemateleotris decora*; G. *Hoplolatilus starcki*; H. *Ctenogobiops tangaroai*; I. *Pogonoperca punctata*).

The study has identified a total of 548 fish species belonging to 248 genera and 82 families in the researched areas (Table 1).

Table 1

Checklist of fish species composition in the waters of Spratly Archipelago, Tho Chu Island and Cat Ba Archipelago of Vietnam

No	Family	Species	TS	TC	CB	IUCN
1	Acanthuridae	*Acanthurus japonicus* (Schmidt 1931)	1			LC
2	Acanthuridae	*Acanthurus lineatus* (Linnaeus 1758)	1			LC
3	Acanthuridae	*Acanthurus nigroris* Valenciennes 1835	1			LC
4	Acanthuridae	*Acanthurus olivaceus* Bloch & Schneider 1801	1			LC
5	Acanthuridae	*Acanthurus pyroferus* Kittlitz 1834	1			LC
6	Acanthuridae	*Acanthurus thompsoni* (Fowler 1923)	1			LC
7	Acanthuridae	*Acanthurus triostegus* (Linnaeus 1758)	1			LC
8	Acanthuridae	*Ctenochaetus cyanocheilus* Randall & Clements 2001	1			LC
9	Acanthuridae	*Ctenochaetus striatus* (Quoy & Gaimard 1825)	1			LC
10	Acanthuridae	*Naso brachycentron* (Valenciennes 1835)	1			LC
11	Acanthuridae	*Naso hexacanthus* (Bleeker 1855)	1			LC
12	Acanthuridae	*Naso lituratus* (Forster 1801)	1			LC
13	Acanthuridae	*Naso unicornis* (Forsskål 1775)	1			LC
14	Acanthuridae	*Zebrasoma scopas* (Cuvier 1829)	1			LC
15	Acanthuridae	*Zebrasoma veliferum* (Bloch 1795)	1			LC
16	Aetobatidae	*Aetobatus narinari* (Euphrasen 1790)	1			EN
17	Aetobatidae	*Aetobatus narutobiei* White, Furumitsu & Yamaguchi 2013			1	VU
18	Anthiadidae	*Mirolabrichthys pascalus* (Jordan & Tanaka 1927)	1			LC
19	Anthiadidae	*Mirolabrichthys tuka* Herre & Montalban 1927	1			LC
20	Anthiadidae	*Nemanthias dispar* (Herre 1955)	1			LC
21	Anthiadidae	*Pseudanthias pleurotaenia* (Bleeker 1857)	1			LC
22	Anthiadidae	*Pseudanthias randalli* (Lubbock & Allen 1978)	1			LC
23	Anthiadidae	*Pseudanthias sp*	1			-
24	Anthiadidae	*Pyronotanthias lori* (Lubbock & Randall 1976)	1			LC
25	Anthiadidae	*Pyronotanthias smithvanizi* (Randall & Lubbock 1981)	1			LC
26	Anthiadidae	*Serranocirrhitus latus* Watanabe 1949	1			LC
27	Apogonidae	*Apogonichthyoides sialis* (Jordan & Thompson 1914)			1	NE
28	Apogonidae	*Archamia sp*			1	-
29	Apogonidae	*Cheilodipterus artus* Smith 1961	1	1		LC
30	Apogonidae	*Cheilodipterus intermedius* Gon 1993		1		NE
31	Apogonidae	*Cheilodipterus isostigmus* (Schultz 1940)		1		LC
32	Apogonidae	*Cheilodipterus macrodon* (Lacepède 1802)	1	1		LC
33	Apogonidae	*Cheilodipterus quinquelineatus* Cuvier 1828	1	1	1	LC
34	Apogonidae	*Nectamia fusca* (Quoy & Gaimard 1825)		1		LC
35	Apogonidae	*Ostorhinchus cavitensis* (Jordan & Seale 1907)			1	NE
36	Apogonidae	*Ostorhinchus compressus* (Smith & Radcliffe 1911)	1			LC
37	Apogonidae	*Ostorhinchus cookii* (Macleay 1881)		1		LC
38	Apogonidae	*Ostorhinchus cyanosoma (Bleeker 1853)*	1	1		LC
39	Apogonidae	*Ostorhinchus endekataenia* (Bleeker 1852)		1		LC
40	Apogonidae	*Ostorhinchus fasciatus* (Shaw 1790)			1	LC
41	Apogonidae	*Ostorhinchus nigrofasciatus* (Lachner 1953)	1			LC
42	Apogonidae	*Ostorhinchus pleuron* (Fraser 2005)			1	NE
43	Apogonidae	*Pristiapogon kallopterus* (Bleeker 1856)	1		1	LC
44	Apogonidae	*Taeniamia fucata* (Cantor 1849)		1		LC
45	Apogonidae	*Taeniamia zosterophora* (Bleeker 1856)	1			LC
46	Apogonidae	*Verulux cypselurus* (Weber 1909)	1			LC
47	Ariidae	*Arius arius* (Hamilton 1822)			1	LC
48	Atelomycteridae	*Atelomycterus marmoratus* (Anonymous [Bennett] 1830)		1		NT
49	Aulostomidae	*Aulostomus chinensis* (Linnaeus 1766)	1			LC
50	Balistidae	*Balistapus undulatus* (Park 1797)	1			LC
51	Balistidae	*Balistoides conspicillum* (Bloch & Schneider 1801)	1			LC
52	Balistidae	*Balistoides viridescens* (Bloch & Schneider 1801)		1		LC
53	Balistidae	*Melichthys vidua* (Richardson 1845)	1			LC
54	Balistidae	*Odonus niger* (Rüppell 1836)	1			LC
55	Balistidae	*Pseudobalistes fuscus* (Bloch & Schneider 1801)	1			LC
56	Balistidae	*Rhinecanthus rectangulus* (Bloch & Schneider 1801)	1			LC
57	Balistidae	*Sufflamen bursa* (Bloch & Schneider 1801)	1			LC
58	Balistidae	*Sufflamen chrysopterum* (Bloch & Schneider 1801)	1			LC
59	Balistidae	*Xanthichthys auromarginatus* (Bennett 1832)	1			LC
60	Belonidae	*Ablennes hians* (Valenciennes 1846)			1	LC
61	Belonidae	*Strongylura leiurus* (Bleeker 1850)			1	NE
62	Blenniidae	*Blenniella sp*		1		-
63	Blenniidae	*Cirripectes castaneus* (Valenciennes 1836)	1			LC
64	Blenniidae	*Cirripectes filamentosus* (Alleyne & MacLeay 1877)	1			LC
65	Blenniidae	*Cirripectes polyzona* (Bleeker 1868)	1			LC

66	Blenniidae	*Ecsenius bathi* Springer 1988	1			LC
67	Blenniidae	*Ecsenius bicolor* (Day 1888)	1	1		LC
68	Blenniidae	*Ecsenius monoculus* Springer 1988	1			LC
69	Blenniidae	*Meiacanthus atrodorsalis* (Günther 1877)	1			LC
70	Blenniidae	*Meiacanthus grammistes* (Valenciennes 1836)	1			LC
71	Blenniidae	*Omobranchus fasciolatoceps* (Richardson 1846)			1	LC
72	Blenniidae	*Petroscirtes breviceps* (Valenciennes 1836)			1	LC
73	Blenniidae	*Plagiotremus laudandus* (Whitley 1961)	1			LC
74	Blenniidae	*Plagiotremus rhinorhynchos* (Bleeker 1852)	1			LC
75	Blenniidae	*Plagiotremus tapeinosoma* (Bleeker 1857)	1			LC
76	Blenniidae	*Salarias fasciatus* (Bloch 1786)	1	1		LC
77	Carangidae	*Alectis ciliaris* (Bloch 1787)			1	LC
78	Carangidae	*Alepes djedaba* (Fabricius 1775)			1	LC
79	Carangidae	*Alepes kleinii* (Bloch 1793)			1	LC
80	Carangidae	*Atropus atropos* (Bloch & Schneider 1801)			1	LC
81	Carangidae	*Atule mate* (Cuvier 1833)		1		LC
82	Carangidae	*Carangoides sp*		1		-
83	Carangidae	*Caranx melampygus* Cuvier 1833	1			LC
84	Carangidae	*Elagatis bipinnulata* (Quoy & Gaimard 1825)	1			LC
85	Carangidae	*Flavocaranx bajad* (Fabricius 1775)		1		LC
86	Carangidae	*Gnathanodon speciosus* (Forsskål 1775)		1	1	LC
87	Carangidae	*Megalaspis cordyla* (Linnaeus 1758)			1	LC
88	Carangidae	*Platycaranx malabaricus* (Bloch & Schneider 1801)			1	LC
89	Carangidae	*Scomberoides commersonnianus* Lacepède 1801		1	1	LC
90	Carangidae	*Scomberoides sp*			1	-
91	Carangidae	*Scyris indica* (Rüppell 1830)			1	LC
92	Carangidae	*Selaroides leptolepis* (Cuvier 1833)		1	1	LC
93	Carangidae	*Seriola dumerili* (Risso 1810)			1	LC
94	Carangidae	*Seriolina nigrofasciata* (Rüppell 1829)			1	LC
95	Carangidae	*Trachinotus baillonii* (Lacepède 1801)		1		LC
96	Carangidae	*Trachinotus mookalee* Cuvier 1832			1	LC
97	Carcharhinidae	*Scoliodon macrorhynchos* (Bleeker 1852)			1	NT
98	Centriscidae	*Aeoliscus strigatus* (Günther 1861)		1		DD
99	Cepolidae	*Acanthocepola abbreviata* (Valenciennes 1835)		1		DD
100	Chaetodontidae	*Chaetodon adiergastos* Seale 1910	1			LC
101	Chaetodontidae	*Chaetodon auriga* Forsskål 1775	1			LC
102	Chaetodontidae	*Chaetodon auripes* Jordan & Snyder 1901	1			LC
103	Chaetodontidae	*Chaetodon baronessa* Cuvier 1829	1			LC
104	Chaetodontidae	*Chaetodon bennetti* Cuvier 1831	1	1		DD
105	Chaetodontidae	*Chaetodon citrinellus* Cuvier 1831	1			LC
106	Chaetodontidae	*Chaetodon ephippium* Cuvier 1831	1			LC
107	Chaetodontidae	*Chaetodon kleinii* Bloch 1790	1			LC
108	Chaetodontidae	*Chaetodon lunula* (Lacepède 1802)	1			LC
109	Chaetodontidae	*Chaetodon lunulatus* Quoy & Gaimard 1825	1			LC
110	Chaetodontidae	*Chaetodon melannotus* Bloch & Schneider 1801	1			LC
111	Chaetodontidae	*Chaetodon octofasciatus* Bloch 1787		1	1	LC
112	Chaetodontidae	*Chaetodon ornatissimus* Cuvier 1831	1			LC
113	Chaetodontidae	*Chaetodon punctatofasciatus* Cuvier 1831	1			LC
114	Chaetodontidae	*Chaetodon rafflesii* Anonymous [Bennett] 1830	1			LC
115	Chaetodontidae	*Chaetodon speculum* Cuvier 1831	1			LC
116	Chaetodontidae	*Chaetodon trifascialis* Quoy & Gaimard 1825	1			LC
117	Chaetodontidae	*Chaetodon ulietensis* Cuvier 1831	1			LC
118	Chaetodontidae	*Chaetodon unimaculatus* Bloch 1787	1			LC
119	Chaetodontidae	*Chaetodon vagabundus* Linnaeus 1758	1			LC
120	Chaetodontidae	*Chaetodon wiebeli* Kaup 1863			1	LC
121	Chaetodontidae	*Chaetodon xanthurus* Bleeker 1857	1			LC
122	Chaetodontidae	*Chelmon rostratus* (Linnaeus 1758)		1	1	LC
123	Chaetodontidae	*Coradion altivelis* McCulloch 1916		1		LC
124	Chaetodontidae	*Coradion chrysozonus* (Cuvier 1831)		1		LC
125	Chaetodontidae	*Coradion melanopus* (Cuvier 1831)	1			LC
126	Chaetodontidae	*Forcipiger flavissimus* Jordan & McGregor 1898	1			LC
127	Chaetodontidae	*Hemitaurichthys polylepis* (Bleeker 1857)	1			LC
128	Chaetodontidae	*Heniochus acuminatus* (Linnaeus 1758)		1		LC
129	Chaetodontidae	*Heniochus chrysostomus* Cuvier 1831	1			LC
130	Chaetodontidae	*Heniochus diphreutes* Jordan 1903	1			LC
131	Chaetodontidae	*Heniochus varius* (Cuvier 1829)	1			LC
132	Chaetodontidae	*Parachaetodon ocellatus* (Cuvier 1831)		1		LC
133	Cirrhitidae	*Cirrhitichthys falco* Randall 1963	1			LC
134	Cirrhitidae	*Cirrhitus pinnulatus* (Forster 1801)	1			LC
135	Cirrhitidae	*Paracirrhites arcatus* (Cuvier 1829)	1			LC
136	Cirrhitidae	*Paracirrhites forsteri* (Schneider 1801)	1			LC
137	Congridae	*Heteroconger hassi* (Klausewitz & Eibl-Eibesfeldt 1959)	1			LC

138	Cynoglossidae	*Cynoglossus arel* (Bloch & Schneider 1801)			1	LC
139	Cynoglossidae	*Cynoglossus bilineatus* (Lacepède 1802)			1	LC
140	Cynoglossidae	*Cynoglossus sp*			1	-
141	Dactylopteridae	*Dactyloptena orientalis* (Cuvier 1829)		1		LC
142	Dasyatidae	*Neotrygon kuhlii* (Müller & Henle 1841)	1	1		DD
143	Dasyatidae	*Taeniura lymma* (Fabricius 1775)	1	1		LC
144	Dasyatidae	*Taeniurops meyeni* (Müller & Henle 1841)	1			VU
145	Diodontidae	*Cyclichthys orbicularis* (Bloch 1785)		1		LC
146	Diodontidae	*Diodon hystrix* Linnaeus 1758	1			LC
147	Diodontidae	*Diodon liturosus* Shaw 1804		1		NE
148	Dorosomatidae	*Clupanodon thrissa* (Linnaeus 1758)			1	LC
149	Dorosomatidae	*Sardinella albella* (Valenciennes 1847)			1	LC
150	Drepaneidae	*Drepane punctata* (Linnaeus 1758)			1	LC
151	Echeneidae	*Echeneis naucrates* Linnaeus 1758		1		LC
152	Engraulidae	*Coilia mystus* (Linnaeus 1758)			1	EN
153	Engraulidae	*Stolephorus continentalis* Hata & Motomura 2018			1	LC
154	Epinephelidae	*Aethaloperca rogaa* (Fabricius 1775)	1			LC
155	Epinephelidae	*Anyperodon leucogrammicus* (Valenciennes 1828)	1			LC
156	Epinephelidae	*Cephalopholis argus* Schneider 1801	1			LC
157	Epinephelidae	*Cephalopholis boenak* (Bloch 1790)	1	1	1	LC
158	Epinephelidae	*Cephalopholis cyanostigma* (Valenciennes 1828)		1		LC
159	Epinephelidae	*Cephalopholis formosa* (Shaw 1812)		1		LC
160	Epinephelidae	*Cephalopholis leopardus (Lacepède 1801)*	1			LC
161	Epinephelidae	*Cephalopholis microprion* (Bleeker 1852)		1		LC
162	Epinephelidae	*Cephalopholis polleni* (Bleeker 1868)	1			LC
163	Epinephelidae	*Cephalopholis sexmaculata* (Rüppell 1830)	1			LC
164	Epinephelidae	*Cephalopholis sonnerati* (Valenciennes 1828)	1	1		LC
165	Epinephelidae	*Cephalopholis urodeta* (Forster 1801)	1			LC
166	Epinephelidae	*Epinephelus areolatus* (Forsskål 1775)		1		LC
167	Epinephelidae	*Epinephelus awoara* (Temminck & Schlegel 1843)			1	LC
168	Epinephelidae	*Epinephelus bleekeri* (Vaillant 1878)		1	1	DD
169	Epinephelidae	*Epinephelus coioides* (Hamilton 1822)		1		LC
170	Epinephelidae	*Epinephelus corallicola* (Valenciennes 1828)		1		LC
171	Epinephelidae	*Epinephelus fasciatus* (Forsskål 1775)	1	1		LC
172	Epinephelidae	*Epinephelus macrospilos* (Bleeker 1855)		1		LC
173	Epinephelidae	*Epinephelus maculatus* (Bloch 1790)	1			LC
174	Epinephelidae	*Epinephelus merra* Bloch 1793	1			LC
175	Epinephelidae	*Epinephelus quoyanus* (Valenciennes 1830)		1	1	LC
176	Epinephelidae	*Epinephelus sexfasciatus* (Valenciennes 1828)		1	1	LC
177	Epinephelidae	*Epinephelus spilotoceps* Schultz 1953	1			LC
178	Epinephelidae	*Gracila albomarginata* (Fowler & Bean 1930)	1			LC
179	Epinephelidae	*Plectropomus maculatus* (Bloch 1790)		1		LC
180	Epinephelidae	*Plectropomus oligacanthus* (Bleeker 1855)	1			LC
181	Epinephelidae	*Variola albimarginata* Baissac 1953	1			LC
182	Fistulariidae	*Fistularia commersonii* Rüppell 1838		1		LC
183	Gerreidae	*Gerres erythrourus* (Bloch 1791)		1		LC
184	Gerreidae	*Gerres oyena* (Forsskål 1775)		1		LC
185	Gerreidae	*Gerres* sp			1	-
186	Gobiesocidae	*Diademichthys lineatus* (Sauvage 1883)		1		LC
187	Gobiidae	*Acanthogobius stigmothonus* (Richardson 1845)			1	NE
188	Gobiidae	*Acentrogobius viridipunctatus* (Valenciennes 1837)			1	LC
189	Gobiidae	*Amblyeleotris gymnocephala* (Bleeker 1853)			1	LC
190	Gobiidae	*Amblyeleotris wheeleri* (Polunin & Lubbock 1977)	1			LC
191	Gobiidae	*Amblygobius phalaena* (Valenciennes 1837)			1	LC
192	Gobiidae	*Bryaninops amplus* Larson 1985		1		LC
193	Gobiidae	*Cryptocentrus pavoninoides* (Bleeker 1849)		1		DD
194	Gobiidae	*Ctenogobiops tangaroai* Lubbock & Polunin 1977	1			LC
195	Gobiidae	*Eviota bifasciata* Lachner & Karnella 1980	1			LC
196	Gobiidae	*Eviota nigriventris* Giltay 1933	1			DD
197	Gobiidae	*Eviota pellucida* Larson 1976	1			LC
198	Gobiidae	*Eviota prasites* Jordan & Seale 1906	1			LC
199	Gobiidae	*Eviota* sp	1			-
200	Gobiidae	*Fusigobius signipinnis* Hoese & Obika 1988	1			LC
201	Gobiidae	*Gnatholepis* sp	1			LC
202	Gobiidae	*Oxyurichthys longicauda* (Steindachner 1893)			1	LC
203	Gobiidae	*Pleurosicya elongata* Larson 1990	1			NE
204	Gobiidae	*Pleurosicya micheli* Fourmanoir 1971	1			LC
205	Gobiidae	*Trimma* sp	1			LC
206	Gobiidae	*Trimma naudei* Smith 1957	1			LC
207	Gobiidae	*Valenciennea sexguttata* (Valenciennes 1837)		1		LC
208	Gobiidae	*Valenciennea strigata* (Broussonet 1782)	1			LC
209	Grammistidae	*Pogonoperca punctata* (Valenciennes 1830)	1			LC

210	Haemulidae	*Diagramma pictum* (Thunberg 1792)		1	1	NT
211	Haemulidae	*Plectorhinchus chaetodonoides* Lacepède 1801	1			NE
212	Haemulidae	*Plectorhinchus vittatus* (Linnaeus 1758)	1			LC
213	Haemulidae	*Pomadasys maculatus* (Bloch 1793)			1	LC
214	Hemiramphidae	*Hemiramphus far* (Fabricius 1775)		1		NE
215	Hemiramphidae	*Hemiramphus lutkei* Valenciennes 1847			1	NE
216	Hemiramphidae	*Rhynchorhamphus georgii* (Valenciennes 1847)			1	LC
217	Holocentridae	*Myripristis hexagona* (Lacepède 1802)	1	1		LC
218	Holocentridae	*Myripristis kuntee* Valenciennes 1831	1			LC
219	Holocentridae	*Myripristis* sp		1		-
220	Holocentridae	*Myripristis violacea* Bleeker 1851	1			LC
221	Holocentridae	*Myripristis vittata* Valenciennes 1831	1			LC
222	Holocentridae	*Neoniphon opercularis* (Valenciennes 1831)	1			LC
223	Holocentridae	*Neoniphon sammara* (Fabricius 1775)	1			LC
224	Holocentridae	*Sargocentron caudimaculatum* (Rüppell 1838)	1			LC
225	Holocentridae	*Sargocentron diadema* (Lacepède 1802)	1			LC
226	Holocentridae	*Sargocentron rubrum* (Forsskål 1775)		1	1	LC
227	Holocentridae	*Sargocentron spiniferum* (Forsskål 1775)	1			LC
228	Kyphosidae	*Kyphosus cinerascens* (Forsskål 1775)	1			LC
229	Kyphosidae	*Kyphosus vaigiensis* (Quoy & Gaimard 1825)		1		LC
230	Labridae	*Anampses twistii* Bleeker 1856	1			LC
231	Labridae	*Bodianus anthioides* (Bennett 1832)	1			LC
232	Labridae	*Bodianus axillaris* (Bennett 1832)	1			LC
233	Labridae	*Bodianus bilunulatus* (Lacepede 1801)	1			LC
234	Labridae	*Bodianus diana* (Lacepède 1801)	1			LC
235	Labridae	*Bodianus mesothorax* (Bloch & Schneider 1801)	1			LC
236	Labridae	*Cheilinus chlorourus* (Bloch 1791)		1		LC
237	Labridae	*Cheilinus fasciatus* (Bloch 1791)	1			LC
238	Labridae	*Cheilinus trilobatus* Lacepède 1801	1	1		LC
239	Labridae	*Choerodon schoenleinii* (Valenciennes 1839)		1		NT
240	Labridae	*Cirrhilabrus cyanopleura* (Bleeker 1851)	1			DD
241	Labridae	*Cirrhilabrus melanomarginatus* Randall & Shen 1978	1			LC
242	Labridae	*Cirrhilabrus* sp1	1			-
243	Labridae	*Cirrhilabrus* sp2	1			-
244	Labridae	*Coris gaimard* (Quoy & Gaimard 1824)	1			LC
245	Labridae	*Diproctacanthus xanthurus* (Bleeker 1856)		1		LC
246	Labridae	*Epibulus insidiator* (Pallas 1770)	1			LC
247	Labridae	*Gomphosus varius* Lacepède 1801	1			LC
248	Labridae	*Halichoeres argus* (Bloch & Schneider 1801)		1		LC
249	Labridae	*Halichoeres bicolor* (Bloch & Schneider 1801)	1	1	1	LC
250	Labridae	*Halichoeres biocellatus* Schultz 1960	1			LC
251	Labridae	*Halichoeres chloropterus* (Bloch 1791)		1		LC
252	Labridae	*Halichoeres chrysotaenia* (Bleeker 1853)		1		LC
253	Labridae	*Halichoeres chrysus* Randall 1981	1			LC
254	Labridae	*Halichoeres hartzfeldii* (Bleeker 1852)	1			LC
255	Labridae	*Halichoeres hortulanus* (Lacepède 1801)	1	1		LC
256	Labridae	*Halichoeres leucurus* (Walbaum 1792)		1		LC
257	Labridae	*Halichoeres marginatus* Rüppell 1835		1		LC
258	Labridae	*Halichoeres melanochir* Fowler & Bean 1928		1		LC
259	Labridae	*Halichoeres melanurus* (Bleeker 1851)		1		LC
260	Labridae	*Halichoeres melasmapomus* Randall 1981	1			LC
261	Labridae	*Halichoeres nebulosus* (Valenciennes 1839)		1		LC
262	Labridae	*Halichoeres nigrescens* (Bloch & Schneider 1801)		1		LC
263	Labridae	*Halichoeres prosopeion* (Bleeker 1853)	1			LC
264	Labridae	*Halichoeres scapularis* (Bennett 1832)		1		LC
265	Labridae	*Halichoeres* sp		1		-
266	Labridae	*Halichoeres trimaculatus* (Quoy & Gaimard 1834)	1			LC
267	Labridae	*Hemigymnus melapterus* (Bloch 1791)		1		LC
268	Labridae	*Hologymnosus doliatus* (Lacepède 1801)	1			LC
269	Labridae	*Iniistius evides* (Jordan & Richardson 1909)		1		LC
270	Labridae	*Iniistius pavo* (Valenciennes 1840)	1			LC
271	Labridae	*Iniistius trivittatus* (Randall & Cornish 2000)			1	DD
272	Labridae	*Labrichthys unilineatus* (Guichenot 1847)	1			LC
273	Labridae	*Labroides bicolor* Fowler & Bean 1928	1			LC
274	Labridae	*Labroides dimidiatus* (Valenciennes 1839)	1	1		LC
275	Labridae	*Labroides pectoralis* Randall & Springer 1975	1			LC
276	Labridae	*Labropsis australis* Randall 1981	1			LC
277	Labridae	*Labropsis manabei* Schmidt 1931	1			LC
278	Labridae	*Labropsis micronesica* Randall 1981		1		LC
279	Labridae	*Labropsis xanthonota* Randall 1981	1			LC
280	Labridae	*Macropharyngodon meleagris* (Valenciennes 1840)	1			LC
281	Labridae	*Macropharyngodon negrosensis* Herre 1932	1			LC

282	Labridae	*Novaculichthys taeniourus* (Lacepède 1801)	1			LC
283	Labridae	*Oxycheilinus bimaculatus* (Valenciennes 1840)	1			LC
284	Labridae	*Oxycheilinus digramma* (Lacepède 1801)	1	1		LC
285	Labridae	*Oxycheilinus orientalis* (Günther 1862)	1			LC
286	Labridae	*Oxycheilinus unifasciatus* (Streets 1877)	1			LC
287	Labridae	*Pseudocheilinus evanidus* Jordan & Evermann 1903	1			LC
288	Labridae	*Pseudocheilinus hexataenia* (Bleeker 1857)	1			LC
289	Labridae	*Pseudocheilinus octotaenia* Jenkins 1901	1			LC
290	Labridae	*Pseudodax moluccanus* (Valenciennes 1840)	1			LC
291	Labridae	*Pseudojuloides cerasinus* (Snyder 1904)	1			DD
292	Labridae	*Pseudojuloides splendens* Victor 2017	1			NE
293	Labridae	*Stethojulis bandanensis* (Bleeker 1851)	1			LC
294	Labridae	*Stethojulis interrupta* (Bleeker 1851)		1		LC
295	Labridae	*Stethojulis trilineata* (Bloch & Schneider 1801)		1		LC
296	Labridae	*Thalassoma amblycephalus* (Bleeker 1856)	1			LC
297	Labridae	*Thalassoma lunare* (Linnaeus 1758)	1	1		LC
298	Labridae	*Thalassoma quinquevittatum* (Lay & Bennett 1839)	1			LC
299	Latilidae	*Branchiostegus albus* Dooley 1978			1	NE
300	Leiognathidae	*Aurigequula longispinis* (Valenciennes 1835)		1		NE
301	Leiognathidae	*Deveximentum interruptum* (Valenciennes 1835)			1	NE
302	Leiognathidae	*Leiognathus equula (Forsskål 1775)*			1	LC
303	Leiognathidae	*Nuchequula gerreoides* (Bleeker 1851)			1	DD
304	Lethrinidae	*Gnathodentex aureolineatus* (Lacepède 1802)	1			LC
305	Lethrinidae	*Gymnocranius* sp	1			-
306	Lethrinidae	*Lethrinus erythropterus* Valenciennes 1830	1			LC
307	Lethrinidae	*Lethrinus lentjan* (Lacepède 1802)	1	1		LC
308	Lethrinidae	*Lethrinus olivaceus* Valenciennes 1830		1		LC
309	Lethrinidae	*Monotaxis grandoculis* (Forsskal 1775)	1			LC
310	Liopropomatidae	*Diploprion bifasciatum* Cuvier 1828		1	1	LC
311	Lutjanidae	*Aphareus furca* (Lacepède 1801)	1			LC
312	Lutjanidae	*Aprion virescens* Valenciennes 1830	1			LC
313	Lutjanidae	*Caesio caerulaurea* Lacepède 1801		1		LC
314	Lutjanidae	*Caesio cuning* (Bloch 1791)		1	1	LC
315	Lutjanidae	*Caesio lunaris* Cuvier 1830	1			LC
316	Lutjanidae	*Caesio teres* Seale 1906	1	1		LC
317	Lutjanidae	*Lutjanus bohar* (Fabricius 1775)	1			LC
318	Lutjanidae	*Lutjanus fulvus* (Forster 1801)	1			LC
319	Lutjanidae	*Lutjanus gibbus* (Forsskål 1775)	1			LC
320	Lutjanidae	*Lutjanus kasmira* (Fabricius 1775)	1			LC
321	Lutjanidae	*Lutjanus lutjanus* Bloch 1790		1	1	LC
322	Lutjanidae	*Lutjanus monostigma* (Cuvier 1828)			1	LC
323	Lutjanidae	*Lutjanus russellii* (Bleeker 1849)			1	LC
324	Lutjanidae	*Lutjanus vitta* (Quoy & Gaimard 1824)		1	1	LC
325	Lutjanidae	*Macolor macularis* Fowler 1931	1			LC
326	Lutjanidae	*Macolor niger* (Forsskål 1775)	1			LC
327	Lutjanidae	*Paracaesio sordida* Abe & Shinohara 1962	1			LC
328	Lutjanidae	*Pterocaesio chrysozona* (Cuvier 1830)		1		LC
329	Lutjanidae	*Pterocaesio marri* Schultz 1953	1			LC
330	Lutjanidae	*Pterocaesio randalli* Carpenter 1987	1			LC
331	Lutjanidae	*Pterocaesio* sp		1		-
332	Lutjanidae	*Pterocaesio tessellata* Carpenter 1987		1		LC
333	Lutjanidae	*Pterocaesio tile* (Cuvier 1830)	1			LC
334	Lutjanidae	*Pterocaesio trilineata* Carpenter 1987	1			LC
335	Malacanthidae	*Hoplolatilus starcki* Randall & Dooley 1974	1			NE
336	Malacanthidae	*Malacanthus brevirostris* Guichenot 1848	1			NE
337	Malacanthidae	*Malacanthus latovittatus* (Lacepède 1801)	1			NE
338	Menidae	*Mene maculata* (Bloch & Schneider 1801)			1	NE
339	Microdesmidae	*Aioliops megastigma* Rennis & Hoese 1987	1			LC
340	Microdesmidae	*Nemateleotris decora* Randall & Allen 1973	1			LC
341	Microdesmidae	*Nemateleotris magnifica* Fowler 1938	1			LC
342	Microdesmidae	*Ptereleotris evides* (Jordan & Hubbs 1925)	1			LC
343	Microdesmidae	*Ptereleotris heteroptera* (Bleeker 1855)	1			LC
344	Microdesmidae	*Ptereleotris zebra* (Fowler 1938)	1			LC
345	Monacanthidae	*Aluterus monoceros* (Linnaeus 1758)			1	LC
346	Monacanthidae	*Monacanthus chinensis* (Osbeck 1765)			1	LC
347	Monacanthidae	*Oxymonacanthus longirostris* (Bloch & Schneider 1801)	1			VU
348	Monacanthidae	*Paramonacanthus otisensis* Whitley 1931			1	LC
349	Monacanthidae	*Pervagor janthinosoma* (Bleeker 1854)	1			LC
350	Mugilidae	*Mugil cephalus* Linnaeus 1758			1	LC
351	Mullidae	*Mulloidichthys flavolineatus* (Lacepède 1801)	1			LC
352	Mullidae	*Mulloidichthys vanicolensis* (Valenciennes 1831)	1			LC
353	Mullidae	*Parupeneus barberinus* (Lacepède 1801)	1			LC

354	Mullidae	*Parupeneus cyclostomus* (Lacepède 1801)	1			LC
355	Mullidae	*Parupeneus heptacanthus* (Lacepède 1802)		1		LC
356	Mullidae	*Parupeneus indicus* (Shaw 1803)	1	1	1	LC
357	Mullidae	*Parupeneus multifasciatus* (Quoy & Gaimard 1825)	1			LC
358	Mullidae	*Parupeneus pleurostigma* (Bennett 1831)	1			LC
359	Mullidae	*Parupeneus trifasciatus* (Lacepède 1801)	1			LC
360	Mullidae	*Upeneus japonicus* (Houttuyn 1782)			1	NE
361	Mullidae	*Upeneus sulphureus* Cuvier 1829			1	LC
362	Mullidae	*Upeneus tragula* Richardson 1846		1	1	LC
363	Muraenesocidae	*Muraenesox bagio* (Hamilton 1822)			1	LC
364	Muraenidae	*Gymnothorax flavimarginatus* (Rüppell 1830)	1			LC
365	Muraenidae	*Gymnothorax javanicus* (Bleeker 1859)	1			LC
366	Muraenidae	*Gymnothorax meleagris* (Shaw 1795)	1			LC
367	Muraenidae	*Gymnothorax reevesii* (Richardson 1845)			1	LC
368	Muraenidae	*Gymnothorax* sp		1		-
369	Muraenidae	*Gymnothorax thyrsoideus* (Richardson 1845)		1		LC
370	Nemipteridae	*Nemipterus japonicus* (Bloch 1791)			1	LC
371	Nemipteridae	*Nemipterus marginatus* (Valenciennes 1830)			1	LC
372	Nemipteridae	*Nemipterus peronii* (Valenciennes 1830)		1		LC
373	Nemipteridae	*Nemipterus* sp			1	-
374	Nemipteridae	*Nemipterus zysron* (Bleeker 1856)			1	LC
375	Nemipteridae	*Pentadopus* sp	1			-
376	Nemipteridae	*Pentapodus caninus* (Cuvier 1830)	1	1		LC
377	Nemipteridae	*Pentapodus setosus* (Valenciennes 1830)		1	1	LC
378	Nemipteridae	*Scolopsis bilineata* (Bloch 1793)	1	1		LC
379	Nemipteridae	*Scolopsis margaritifera* (Cuvier 1830)	1	1		LC
380	Nemipteridae	*Scolopsis monogramma* (Cuvier 1830)		1		LC
381	Nemipteridae	*Scolopsis* sp		1		-
382	Nemipteridae	*Scolopsis taenioptera* (Cuvier 1830)		1	1	LC
383	Nemipteridae	*Scolopsis vosmeri* (Bloch 1792)		1	1	LC
384	Ophichthidae	*Myrichthys colubrinus* (Boddaert 1781)	1			LC
385	Ophichthidae	*Ophichthus* sp			1	-
386	Ostraciidae	*Ostracion cubicum* Linnaeus 1758	1	1	1	NE
387	Ostraciidae	*Ostracion meleagris* Shaw 1796	1			NE
388	Ostraciidae	*Ostracion rhinorhynchos* Bleeker 1851		1		NE
389	Paralichthyidae	*Pseudorhombus dupliciocellatus* Regan 1905		1		LC
390	Paralichthyidae	*Pseudorhombus elevatus* Ogilby 1912		1		LC
391	Paralichthyidae	*Pseudorhombus levisquamis* (Oshima 1927)			1	LC
392	Pempheridae	*Pempheris analis* Waite 1910		1		LC
393	Pempheridae	*Pempheris nyctereutes* Jordan & Evermann 1902			1	NE
394	Pempheridae	*Pempheris oualensis* Cuvier 1831	1	1		NE
395	Pinguipedidae	*Parapercis filamentosa* (Steindachner 1879)		1		NE
396	Pinguipedidae	*Parapercis hexophtalma* (Cuvier 1829)	1			LC
397	Pinguipedidae	*Parapercis xanthozona* (Bleeker 1849)		1	1	LC
398	Platycephalidae	*Inegocia japonica* (Cuvier 1829)			1	LC
399	Platycephalidae	*Platycephalus* sp			1	-
400	Platycephalidae	*Rogadius patriciae* Knapp 1987		1		LC
401	Plesiopidae	*Calloplesiops altivelis* (Steindachner 1903)	1			LC
402	Plotosidae	*Plotosus lineatus* (Thunberg 1787)		1	1	LC
403	Pomacanthidae	*Centropyge bispinosa* (Günther 1860)	1			LC
404	Pomacanthidae	*Centropyge colini* Smith-Vaniz & Randall 1974	1			LC
405	Pomacanthidae	*Centropyge heraldi* Woods & Schultz 1953	1			LC
406	Pomacanthidae	*Centropyge vrolikii* (Bleeker 1853)	1			LC
407	Pomacanthidae	*Genicanthus bellus* Randall 1975	1			LC
408	Pomacanthidae	*Genicanthus melanospilos* (Bleeker 1857)	1			LC
409	Pomacanthidae	*Pygoplites diacanthus* (Boddaert 1772)	1			LC
410	Pomacanthidae	*Apolemichthys trimaculatus* (Cuvier 1831)	1			LC
411	Pomacanthidae	*Pomacanthus imperator* (Bloch 1787)	1			LC
412	Pomacentridae	*Abudefduf bengalensis* (Bloch 1787)		1	1	LC
413	Pomacentridae	*Abudefduf notatus* (Day 1870)		1		LC
414	Pomacentridae	*Abudefduf sexfasciatus* (Lacepède 1801)		1		LC
415	Pomacentridae	*Abudefduf sordidus* (Forsskål 1775)		1		LC
416	Pomacentridae	*Abudefduf vaigiensis* (Quoy & Gaimard 1825)	1	1		LC
417	Pomacentridae	*Amblyglyphidodon aureus* (Valenciennes 1830)	1			LC
418	Pomacentridae	*Amblyglyphidodon curacao* (Bloch 1787)	1			LC
419	Pomacentridae	*Amblyglyphidodon leucogaster* (Bleeker 1847)	1			LC
420	Pomacentridae	*Amphiprion clarkii* (Bennett 1830)	1			LC
421	Pomacentridae	*Amphiprion frenatus* Brevoort 1856	1			LC
422	Pomacentridae	*Amphiprion melanopus* Bleeker 1852	1			LC
423	Pomacentridae	*Amphiprion ocellaris* Cuvier 1830	1			LC
424	Pomacentridae	*Amphiprion perideraion* Bleeker 1855	1	1		LC
425	Pomacentridae	*Amphiprion polymnus* (Linnaeus 1758)	1			LC

426	Pomacentridae	*Amphiprion sandaracinos* Allen 1972	1			LC
427	Pomacentridae	*Azurina lepidolepis* (Bleeker 1876)	1			LC
428	Pomacentridae	*Chromis alpha* Randall 1988	1			LC
429	Pomacentridae	*Chromis atripectoralis* Welander & Schultz 1951		1		LC
430	Pomacentridae	*Chromis chrysura* (Bliss 1883)	1			LC
431	Pomacentridae	*Chromis* sp1	1			-
432	Pomacentridae	*Chromis* sp2	1			-
433	Pomacentridae	*Chromis ternatensis* (Bleeker 1856)	1	1		LC
434	Pomacentridae	*Chromis viridis* (Cuvier 1830)	1	1		LC
435	Pomacentridae	*Chromis weberi* Fowler & Bean 1928	1			LC
436	Pomacentridae	*Chromis xanthura* (Bleeker 1854)	1			LC
437	Pomacentridae	*Chrysiptera brownriggii* (Bennett 1828)	1			LC
438	Pomacentridae	*Chrysiptera chrysocephala* Manica, Pilcher & Oakley 2002	1			NE
439	Pomacentridae	*Chrysiptera cyanea* (Quoy & Gaimard 1825)	1			LC
440	Pomacentridae	*Chrysiptera rollandi* (Whitley 1961)	1			LC
441	Pomacentridae	*Dascyllus aruanus* (Linnaeus 1758)	1			LC
442	Pomacentridae	*Dascyllus reticulatus* (Richardson 1846)	1	1		LC
443	Pomacentridae	*Dascyllus trimaculatus* (Rüppell 1829)	1	1		LC
444	Pomacentridae	*Dischistodus perspicillatus* (Cuvier 1830)	1			LC
445	Pomacentridae	*Lepidozygus tapeinosoma* (Bleeker 1856)	1			LC
446	Pomacentridae	*Neoglyphidodon melas* (Valenciennes 1830)	1			LC
447	Pomacentridae	*Neoglyphidodon nigroris* (Cuvier 1830)	1			LC
448	Pomacentridae	*Neoglyphidodon* sp	1			-
449	Pomacentridae	*Neoglyphidodon thoracotaeniatus* (Fowler & Bean 1928)	1			LC
450	Pomacentridae	*Neopomacentrus anabatoides* (Bleeker 1847)		1		LC
451	Pomacentridae	*Neopomacentrus bankieri* (Richardson 1846)			1	LC
452	Pomacentridae	*Neopomacentrus cyanomos (*Bleeker 1856)		1	1	LC
453	Pomacentridae	*Plectroglyphidodon dickii* (Liénard 1839)	1			NT
454	Pomacentridae	*Plectroglyphidodon leucozonus* (Bleeker 1859)	1			LC
455	Pomacentridae	*Plectroglyphidodon obreptus* (Whitley 1948)		1		LC
456	Pomacentridae	*Plectroglyphidodon* sp		1		-
457	Pomacentridae	*Pomacentrus alexanderae* Evermann & Seale 1907	1			NE
458	Pomacentridae	*Pomacentrus amboinensis* Bleeker 1868	1			NE
459	Pomacentridae	*Pomacentrus bankanensis* Bleeker 1854	1			LC
460	Pomacentridae	*Pomacentrus chrysurus* Cuvier 1830		1		LC
461	Pomacentridae	*Pomacentrus coelestis* Jordan & Starks 1901		1		LC
462	Pomacentridae	*Pomacentrus grammorhynchus* Fowler 1918		1		LC
463	Pomacentridae	*Pomacentrus lepidogenys* Fowler & Bean 1928	1			NT
464	Pomacentridae	*Pomacentrus moluccensis* Bleeker 1853	1	1		LC
465	Pomacentridae	*Pomacentrus nigromarginatus* Allen 1973	1			LC
466	Pomacentridae	*Pomacentrus pavo* (Bloch 1787)	1			LC
467	Pomacentridae	*Pomacentrus philippinus* Evermann & Seale 1907	1			LC
468	Pomacentridae	*Pomacentrus simsiang* Bleeker 1856	1	1		LC
469	Pomacentridae	*Pomacentrus vaiuli* Jordan & Seale 1906	1			LC
470	Pomacentridae	*Pycnochromis atripes* (Fowler & Bean 1928)	1			LC
471	Pomacentridae	*Pycnochromis lineatus* (Fowler & Bean 1928)	1			LC
472	Pomacentridae	*Pycnochromis margaritifer* (Fowler 1946)	1			LC
473	Pomacentridae	*Pycnochromis ovatiformis* (Fowler 1946)	1			LC
474	Pomacentridae	*Pycnochromis retrofasciatus* (Weber 1913)	1			LC
475	Pomacentridae	*Stegastes lacrymatus* (Quoy & Gaimard 1825)	1	1		NE
476	Priacanthidae	*Heteropriacanthus cruentatus* (Lacepède 1801)	1			LC
477	Priacanthidae	*Priacanthus hamrur* (Fabricius 1775)	1			LC
478	Priacanthidae	*Priacanthus* sp	1			-
479	Priacanthidae	*Priacanthus tayenus* Richardson 1846		1		LC
480	Pseudochromidae	*Congrogadus subducens* (Richardson 1843)			1	LC
481	Pseudochromidae	*Pictichromis diadema* (Lubbock & Randall 1978)	1			LC
482	Scaridae	*Cetoscarus bicolor* (Rüppell 1829)	1			LC
483	Scaridae	*Chlorurus capistratoides* (Bleeker 1847)	1			LC
484	Scaridae	*Chlorurus microrhinos* (Bleeker 1854)	1			LC
485	Scaridae	*Chlorurus sordidus* (Forsskål 1775)	1			LC
486	Scaridae	*Scarus dimidiatus* Bleeker 1859	1			LC
487	Scaridae	*Scarus forsteni* (Bleeker 1861)	1			LC
488	Scaridae	*Scarus ghobban* Fabricius 1775	1	1		LC
489	Scaridae	*Scarus hypselopterus* Bleeker 1853		1		NT
490	Scaridae	*Scarus niger* Forsskål 1775	1			LC
491	Scaridae	*Scarus psittacus* Forsskål 1775		1		LC
492	Scaridae	*Scarus schlegeli* (Bleeker 1861)	1			LC
493	Scatophagidae	*Scatophagus argus* (Linnaeus 1766)		1	1	LC
494	Sciaenidae	*Collichthys lucidus* (Richardson 1844)			1	LC
495	Sciaenidae	*Pennahia anea* (Bloch 1793)			1	LC
496	Scombridae	*Scomberomorus commerson* (Lacepède 1800)			1	NT
497	Scorpaenidae	*Pterois antennata* (Bloch 1787)	1			LC

498	Scorpaenidae	*Pterois radiata* Cuvier 1829	1			LC
499	Scorpaenidae	*Pterois volitans* (Linnaeus 1758)	1			LC
500	Scorpaenidae	*Scorpaenopsis longispina* Randall & Eschmeyer 2002		1		DD
501	Scorpaenidae	*Scorpaenopsis neglecta* Heckel 1837		1		LC
502	Scorpaenidae	*Scorpaenopsis papuensis* (Cuvier 1829)		1		LC
503	Scorpaenidae	*Scorpaenopsis ramaraoi* Randall & Eschmeyer 2002			1	LC
504	Scorpaenidae	*Scorpaenopsis* sp	1			-
505	Scorpaenidae	*Sebastiscus marmoratus* (Cuvier 1829)			1	NE
506	Scorpaenidae	*Taenianotus triacanthus* Lacepede 1802	1			LC
507	Siganidae	*Siganus argenteus* (Quoy & Gaimard 1825)	1			LC
508	Siganidae	*Siganus canaliculatus* (Park 1797)		1		LC
509	Siganidae	*Siganus corallinus* (Valenciennes 1835)		1		LC
510	Siganidae	*Siganus fuscescens* (Houttuyn 1782)		1	1	LC
511	Siganidae	*Siganus guttatus* (Bloch 1787)		1	1	LC
512	Siganidae	*Siganus javus* (Linnaeus 1766)		1		LC
513	Siganidae	*Siganus puellus* (Schlegel 1852)	1			LC
514	Siganidae	*Siganus punctatus* (Schneider & Forster 1801)		1		LC
515	Siganidae	*Siganus virgatus* (Valenciennes 1835)		1		LC
516	Siganidae	*Siganus vulpinus* (Schlegel & Muller 1845)	1			LC
517	Sillaginidae	*Sillago aeolus* Jordan & Evermann 1902		1		NE
518	Sillaginidae	*Sillago sihama* (Fabricius 1775)		1	1	LC
519	Soleidae	*Aesopia cornuta* Kaup 1858		1		LC
520	Soleidae	*Brachirus orientalis* (Bloch & Schneider 1801)			1	LC
521	Soleidae	*Pardachirus pavoninus* (Lacepède 1802)		1	1	LC
522	Sparidae	*Evynnis cardinalis* (Lacepède 1802)			1	EN
523	Sparidae	*Pagrus major* (Temminck & Schlegel 1843)			1	LC
524	Sphyraenidae	*Sphyraena pinguis* Günther 1874			1	NE
525	Sphyraenidae	*Sphyraena putnamae* Jordan & Seale 1905			1	NE
526	Sphyraenidae	*Sphyraena* sp		1		-
527	Stromateidae	*Pampus minor* Liu & Li 1998			1	NE
528	Synanceiidae	*Inimicus cuvieri* (Gray 1835)		1		NE
529	Synodontidae	*Harpadon nehereus* (Hamilton 1822)		1	1	NT
530	Synodontidae	*Saurida macrolepis* Tanaka 1917			1	LC
531	Synodontidae	*Saurida tumbil* (Bloch 1795)		1		LC
532	Synodontidae	*Trachinocephalus sp*			1	LC
533	Synodontidae	*Trachinocephalus trachinus* (Temminck & Schlegel 1846)		1	1	LC
534	Terapontidae	*Pelates quadrilineatus* (Bloch 1790)		1	1	LC
535	Terapontidae	*Rhynchopelates oxyrhynchus* (Temminck & Schlegel 1843)			1	NE
536	Terapontidae	*Terapon jarbua* (Fabricius 1775)			1	LC
537	Terapontidae	*Terapon theraps* Cuvier 1829		1	1	LC
538	Tetraodontidae	*Arothron hispidus* (Linnaeus 1758)	1			LC
539	Tetraodontidae	*Arothron nigropunctatus* (Bloch & Schneider 1801)	1			LC
540	Tetraodontidae	*Arothron stellatus* (Anonymous 1798)		1		LC
541	Tetraodontidae	*Canthigaster janthinoptera* (Bleeker 1855)	1			LC
542	Tetraodontidae	*Canthigaster valentini* (Bleeker 1853)	1			LC
543	Tetraodontidae	*Lagocephalus spadiceus* (Richardson 1845)		1	1	LC
544	Triakidae	*Mustelus manazo* Bleeker 1854		1		EN
545	Trichiuridae	*Lepturacanthus savala* (Cuvier 1829)			1	NE
546	Tripterygiidae	*Helcogramma striata* Hansen 1986	1	1		LC
547	Trypterygiidae	*Ucla xenogrammus* Holleman 1993	1			LC
548	Zanclidae	*Zanclus cornutus* (Linnaeus 1758)	1			LC
	Total		325	176	123	

Note: TS - Spratly Archipelago; TC - Tho Chu Island; CB - Cat Ba Archipelago; NE - not evaluated; DD - data deficient; LC - least concern; NT - near threatened; VU - vulnerable; EN - endangered.

Among these, the Spratly Archipelago exhibits the highest species count at 325, followed by Tho Chu Island with 176 species, and 123 species documented in the Cat Ba area (Figure 3). Additionally, there were 10 families with the highest recorded number of species, each containing more than 15 species. These families account for approximately 56.6% of the total fauna in this study, include Labridae (69 species), Pomacentridae (64), Chaetodontidae (33), Epinephelidae (28), Lutjanidae (24), Gobiidae (22), Carangidae (20), Apogonidae (20), Acanthuridae (15), and Blenniidae (15) (Table 2).

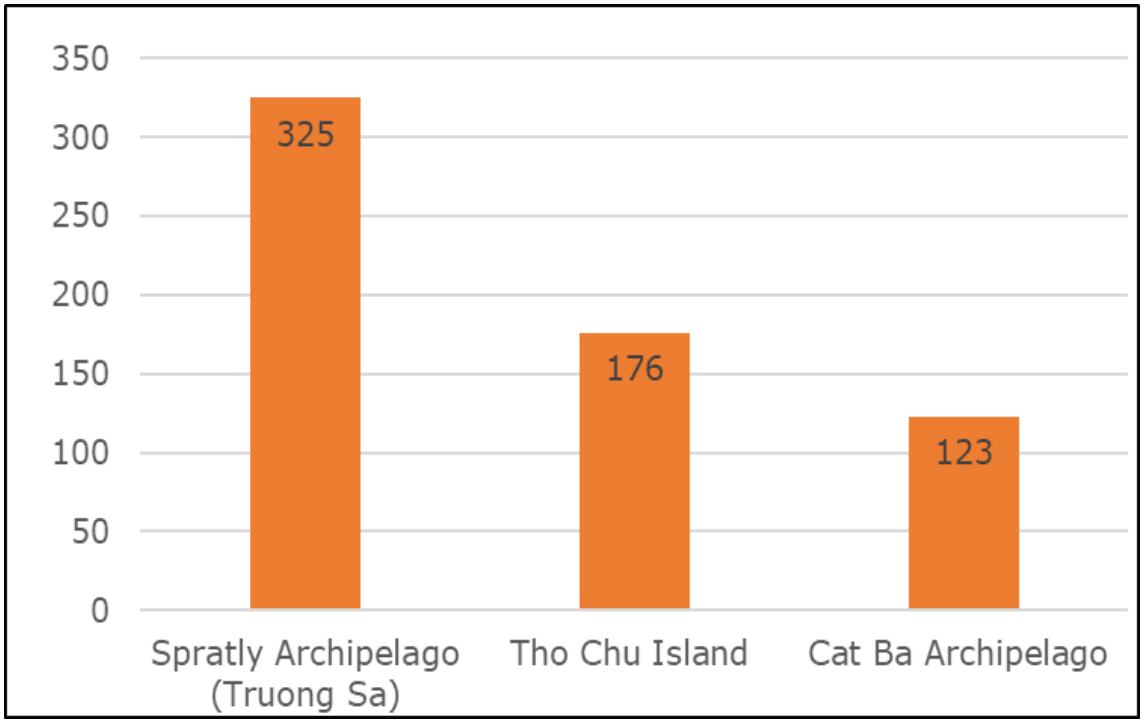

Figure 3. Distribution of number of fish species recorded in each study area.

Table 2

Number of species of the top 10 families recorded in the study areas

No	*Family*	*Total*	*TS*	*TC*	*CB*
1	Acanthuridae	15	15	0	0
2	Labridae	69	49	25	2
3	Pomacentridae	64	51	21	3
4	Chaetodontidae	33	26	7	3
5	Epinephelidae	28	16	14	5
6	Lutjanidae	24	15	8	5
7	Gobiidae	22	14	3	5
8	Carangidae	20	2	7	14
9	Apogonidae	20	9	10	7
10	Blenniidae	15	12	3	2
11	Other family	238	116	78	77
	Total	548	325	176	123

Note: TS - Spratly Archipelago; TC - Tho Chu Island; CB - Cat Ba Archipelago.

The similarity in species composition of the 548 recorded species at the three surveyed locations in this study is presented in Figure 4. There is a clear division into two branches, including the offshore islands branch (Spratly Archipelago) and the nearshore islands branch (Tho Chu Island, Cat Ba Archipelago).

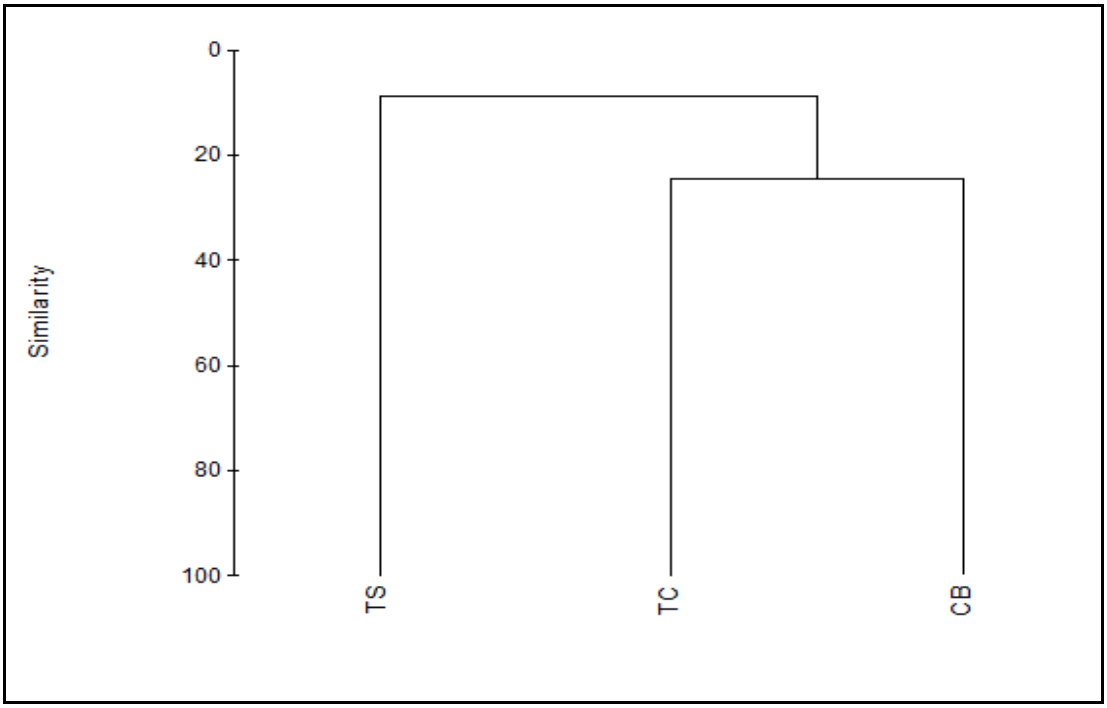

Figure 4. Cluster analysis of total species at the three surveyed locations in this study (TS - Spratly Archipelago; TC - Tho Chu Island; CB - Cat Ba Archipelago).

Furthermore, 16 species listed in the IUCN Red List of Threatened Species (IUCN 2023) have been recorded, displaying varying levels of vulnerability: 9 Near Threatened (NT) species, 3 Vulnerable (VU) species, and 4 Endangered (EN) species (Table 3).

Table 3

List of species from the IUCN Red List (2023)

No	*Family*	*Species*	*IUCN (2023)*
1	Atelomycteridae	*Atelomycterus marmoratus* (Anonymous [Bennett] 1830)	NT
2	Carcharhinidae	*Scoliodon macrorhynchos* (Bleeker 1852)	NT
3	Haemulidae	*Diagramma pictum* (Thunberg 1792)	NT
4	Labridae	*Choerodon schoenleinii* (Valenciennes 1839)	NT
5	Pomacentridae	*Plectroglyphidodon dickii* (Liénard 1839)	NT
6	Pomacentridae	*Pomacentrus lepidogenys* Fowler & Bean 1928	NT
7	Scaridae	*Scarus hypselopterus* Bleeker 1853	NT
8	Scombridae	*Scomberomorus commerson* (Lacepède 1800)	NT
9	Synodontidae	*Harpadon nehereus* (Hamilton 1822)	NT
10	Aetobatidae	*Aetobatus narutobiei* White, Furumitsu & Yamaguchi 2013	VU
11	Dasyatidae	*Taeniurops meyeni* (Müller & Henle 1841)	VU
12	Monacanthidae	*Oxymonacanthus longirostris* (Bloch & Schneider 1801)	VU
13	Aetobatidae	*Aetobatus narinari* (Euphrasen 1790)	EN
14	Engraulidae	*Coilia mystus* (Linnaeus 1758)	EN
15	Sparidae	*Evynnis cardinalis* (Lacepède 1802)	EN
16	Triakidae	*Mustelus manazo* Bleeker 1854	EN

Discussion. The research findings reveal that the number of coral reef fish species in the Spratly Archipelago area is higher compared to the northern and southern regions of Vietnam, aligning with prior studies. For Vietnam, there are four significant coral reef distribution zones: Quang Ninh-Cat Ba, Cu Lao Cham-Nha Trang, An Thoi (Phu Quoc - Tho Chu), and the Spratly archipelago (Quan & The 2014). Among these areas, Spratly

Archipelago and Nha Trang have been noted to host a higher diversity of coral reef fish species compared to other marine regions in Vietnam (Quan & Thi 2006; Nguyen & Mai 2020). One possible explanation for this phenomenon lies in the favorable natural conditions that support coral reef development, providing refuge and suitable environments for coral reef fish species. Particularly, the Spratly Archipelago is situated close to the center of dispersal and coral diversity between the Philippines and Indonesia, where diverse coral reefs are present. Meanwhile, the northern and southwestern coastal areas of Vietnam have higher turbidity and lower salinity levels, contributing to less favorable coral reef development (Nguyen & Mai 2020).

Among the 9 newly recorded species, their presence is predominantly concentrated in offshore waters (Spratly Archipelago), while neither Cat Ba and Tho Chu areas have documented any of these species. Additionally, there is a need for further research to assess and potentially update the previously recorded *P. cerasinus* species by Randall & Lim (2000) in the South China Sea. This is to determine whether it is indeed *P. splendens*, especially considering the separation of the *P. cerasinus* species complex into distinct species (Parenti & Randall 2018).

One notable aspect of this study is the investigation of species composition using Scuba diving at depths exceeding 30 m, which has not been extensively explored in previous research in Vietnam. Earlier publications mainly focused on depths ranging from 0-30 m (Khuong et al 2016; Duy et al 2017; Dat 2019; Nguyen & Mai 2020) or performed at a greater depth, but rarely mentioned. During the diving expeditions to depths between 30-65 m using Scuba equipment, the research team recorded several fish species such as *Centropyge colini, Taeniurops meyeni, Genicanthus bellus*. These are fish species that usually live at depths greater than 20 m (Sommer et al 1996; Pyle 2001), thus being rarely observed in Vietnamese waters. However, because diving at great depth is limited in terms of diving time, effort and equipment, the search and observation of species in this study is still limited.

The study also recorded several species belonging to the Gobiidae family (genera *Trima, Eviota*) with small sizes, measuring under 3.5 cm in length (Kuiter & Tonozuka 2001; Greenfield & Winterbottom 2016). These species often have the nature of living hidden or camouflaged under objects such as corals or sponges, making them very difficult to recognize. These findings, to some extent, demonstrate that the coral reef fish diversity in Vietnam still holds many unexplored aspects, emphasizing the need for further in-depth studies on coral reef fish in the Vietnamese marine waters.

Conclusions. The study has identified a total of 548 fish species belonging to 248 genera and 82 families in the East Vietnam Sea. Spratly Archipelago has the highest number of species (325 species) and family Labridae exhibits the highest number of species with 69 species. There is a difference in classification of species composition in different survey areas including remote islands (Spratly Archipelago) and coastal zones (Tho Chu Island, Cat Ba Archipelago). Of the 548 species that have been recorded, 9 species, namely *Pleurosicya elongata* Larson 1990, *Ctenogobiops tangaroai* Lubbock & Polunin 1977, *Eviota nigriventris* Giltay 1933, *Pogonoperca punctata* (Valenciennes 1830), *Pseudojuloides splendens* Victor 2017, *Hoplolatilus starcki* Randall & Dooley 1974, *Nemateleotris decora* Randall & Allen 1973, *Centropyge colini* Smith-Vaniz & Randall 1974, *Genicanthus bellus* Randall 1975, are founded to be new to the fauna of Vietnam and 16 species are listed in the IUCN Red List of Threatened Species.

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Conflict of Interest. The authors declare that there is no conflict of interest.

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