Species composition and catch of sharks, rays and skates in Ba Ria - Vung Tau and Binh Thuan provinces of Vietnam

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ABSTRACT

Research on 2,626 individuals of sharks, rays and skates in total of 123 fishing boats were sampled during 2015 to 2016 in Ba Ria - Vung Tau and Binh Thuan provinces. The results identified 77 species of sharks, rays and skates belong to 22 families and 10 orders in Ba Ria - Vung Tau and Binh Thuan provinces. Of these, 57 species were recorded in Ba Ria - Vung Tau and 48 species in Binh Thuan. The families were found in the highest number of species such as *Carcharhinidae* family with 9 species, *Dasyatidae* family with 19 species and *Rajidae* family with 5 species. The total catch of sharks, rays and skates was 23,599 tons in Ba Ria - Vung Tau and was 24,355 tons in Binh Thuan. Sharks, rays and skates ratio made up from 0.2% to 0.5% in total catch landing from landing sites. Total length of sharks ranges from 21.0 cm to 366.0 cm, disc length of rays fluctuates from 11.0 cm to 248.0 cm and skates have a range from 0.7 cm to 152.0 cm in disc length.

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1. Introduction

Vietnam's territorial waters are home of a rich diversity of sharks, rays, skates and chimaeras (Class Chondrichthyes), which accounts for about 17% of the total number of species recorded worldwide and predominates in the surrounding area (Nguyen et al., 1972). Sharks, rays and skates in the cartilaginous category are high nutritional levels, long life cycles, late reproduction and low fertile reproduction. Sharks, rays and skates are caught by various fishing gears such as trawl nets, gillnets and longlines. Research on sharks, rays and skates have not yet conducted fully in freshwater, estuarine and the exclusive economic zone of Vietnam. In the period of 2000 -2005, there were 38 species belonging to 16 shark families (Vu & Tran, 2009) and 40 ray species belonging to 19 genera in 9 families of 2 Orders were statistically recorded (Tran & Vu, 2011) in Vietnam sea. There were 12 species belong to 5 families of shark was identified in Quy Nhon and neighboring waters (Vo et al., 2013).

A pilot project of Southeast Asian Fisheries Development Center (SEAFDEC) on recording landing data of sharks, rays and skates up to species level was conducted in the Ba Ria - Vung Tau and Binh Thuan provinces of Vietnam from 2015 to 2016. Vung Tau city, La Gi and Phan Thiet towns were selected as the study sites as it were the main landing sites of sharks, rays and skates in the states. The landing data were col-

lected at 7 jetties, with five jetties in Ba Ria - Vung Tau and two jetties in Binh Thuan. This report is a part of the research results of the project.

2. Materials and Methods

2.1. Selection of study sites

Ba Ria - Vung Tau and Binh Thuan are two main fish landing provinces in the Southeastern region of Vietnam. Vung Tau city and Lagi town are two major sites were selected as study sites for sharks, rays and skates data collection. The landing data were collected at 07 jetties, such as Ben Da, Incomat, Cat Lo, Phuoc Tinh and Ward 5 jetties in Ba Ria - Vung Tau province and Lagi, Phan Thiet jetties in Binh Thuan province (Figure 1).

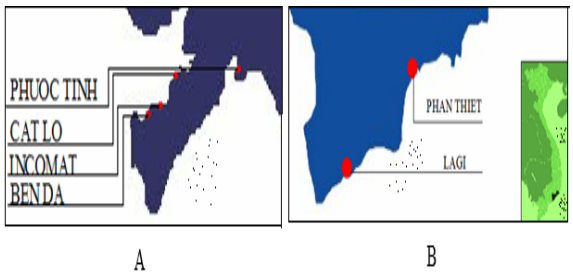

Figure 1. Location of study sites in Ba Ria - Vung Tau (A) and Binh Thuan (B) provinces.

2.2. Sampling methods

The sampling activity started in September 2015 to 31 August 2016. All enumerators were requested to record landing data and other related information via the standard. A standard SOP entitled 'SOP Sharks and Rays Data Collection in the Southeast Asian Waters' was produced. The content included Standard Operation Procedure and instructions to how enumerators to measure, weigh, record sharks, rays and skates species at sampling sites, name of enumerator, name of landing site, date of sampling, vessel registered number, vessel GRT, fishing area, price at landing sites, name of species (common name and scientific name), total catch of sharks, rays and skates commercial and low-value species from each sampling vessel.

2.3. Selection of fishing vessels and sampling activities

Between 1-4 fishing boats were selected for sampling each day for 5 days per month at each landing site. Measurement of total length (TL) was taken for all skates, sharks species and rays from the families *Rhynchobatidae, Rhinobatidae and Narcinidae*. While disc length (DL) was taken for all ray species having the tail is frequently absent or damaged (mainly from the families *Dasyatidae, Gymnuridae and Mobulidae*). All sharks, rays and skates were measured and weighed if the total number was less than 50 tails per vessel, otherwise, only 10-50% of them were sampled. The maturity stage for each individual was estimated according to Ahmad & Annie Lim (2012). The total catch of all sharks, rays and skates by species as well as the total catch of commercial and low-value species were also recorded for each sampling vessel.

2.4. Landing sample

In Ba Ria - Vung Tau province, 50 trawlers and 62 vessels were sampled. In Ba Binh Thuan province 103 trawlers, 09 vessels of gillnet and 11 ves-sels of longline fisheries were sampled.

2.5. Sample size

Ba Ria - Vung Tau province: A total of 1,037 tails belong to 239 rays, 398 sharks and 400 skates were sampled.

Binh Thuan province: A total of 1,589 tails belong to 409 rays, 199 sharks and 981 skates were sampled.

2.6. Classification

The classification (scientific names) used in this study follows that of Compagno (1999), Ahmad et al. (2013, 2014), and Ebert et al. (2013).

2.7. Data analysis

MS Excel software was used to analyse data.

Coefficient of species similarity analysis: Using formula of Magurran (1988).

3. Results and Discusions

3.1. Species diversity of sharks, rays and skates

The results of this study recorded 77 species of sharks, rays and skates that belong to 22 families and 10 orders (Table 1). In particular, 57 species were recored in Ba Ria - Vung Tau and 48 species in Binh Thuan. There were 29 species of sharks from six orders and 11 families, 43 species of rays from three orders and 10 families, and 5 species of skate from one order and one family were recorded (Table 1). The average species similarity index of sharks, rays and skates is 0.50 in the two sites. In particular, the coefficient of similarity among species groups ranged from 0.47 to 0.57.

For the shark, *Carcharhinidae* family was found 9 species, it was the highest number. Following, the family of *Scyliorhinidae* was identifed with 5 species and *Hemiscylliidae* with 4 species. The other shark families were numbered between 1 and 2 species (Figure 2). For the rays, the family of *Dasyatidae* was found the highest number of species with 19 species. Of these, the two families of *Myliobatidae* and *Narcinidae* found six species. The other ray families only found from 1 to 2 species. There was only one family of *Rajidae* of skate which has 5 species (Figure 3).

Vu & Tran (2009) recorded 38 species belong to 16 shark families in Vietnam from 2000 to 2005. Dao (2001) also recorded 20 species of 4 shark families in the Tonkin Gulf Seawaters. Vo et al. (2013) identified 12 species belong to 5 families of shark collections in Quy Nhon and neighboring waters. Meanwhile, Bui & Tran (2005) recorded 107 species belong to 15 shark families from different sources of Vietnam. A total of 40 rays species belonging to 19 genera in 9 families of 2 orders were observed in the period from 2000 to 2005. The species richness was observed in the South-eastern and central waters of Vietnam. Family of *Dasyatidae* got the highest abundance with 14 species (Tran & Vu, 2011). Previously, Nguyen et al. (1972) published 39 species of 12 ray families in Vietnam seawater. However, there are now many changes and rearrangement of shark and ray classification systems (Ahmad et al., 2017). Therefore, if it is corrected, the numbers of species and families of shark and rays will have many changes.

3.2. Fishing catch composition

The total catch of sharks, rays and skates was 23,599 tons in Ba Ria - Vung Tau and 24,355 tons in Binh thuan provinces.

In Ba Ria - Vung Tau, rays and skates were mainly sampled from trawl net and gillnet. The highest catch of rays and skates were 4,534.6 kg and 2,235.4 kg, respectively in October. Sharks were mainly sampled from both gillnet and trawl net in Ba Ria - Vung Tau in several months with 73% from gillnet and 27% from trawl net. Skates were collected only from trawl net fishery and reached 37% in total elasmobranch catch (Figure 4).

In Binh Thuan, rays and skates mainly were sampled from trawl net. The highest catch of rays was 1,046.9 kg in September and skates was 1,798 kg in April. Sharks mainly were sampled from longline reached 80% in May and June 2016, but sharks were sampled every months in gillnet and trawl net in light weight. Catch of skates and rays reached over 90% from trawl net (Figure 4).

3.3. Shark, ray and skate composition

A total of 3,602.57 tons of fish was landed in Ba Ria - Vung Tau from 112 landings during the study period. Sharks, rays and skates ratio made up 0.2%, 0.3% and 0.2% respectively in total catch landing, while landings of bony fish species were 99.34%. The elasmobranch catches gained small rate under 0.5% in total catch. The average landings per month for sharks, rays and skates were 504.8 kg, 754.2 kg and 721.3 kg respectively. The highest landing by month for sharks was 1,397.9kg in October, followed by 1,222.1kg in January. The highest landing of rays was 4,497.7 kg in October, followed by 1,046.9 kg in September. The highest landing of skates was 2,235.4 kg in October, followed by 1,793.0 kg in May (Figure 5).

At landing sites in Binh Thuan, total of 2,096.59 tons of fish was landed from 133 landings. Catch rate of sharks, rays and skates made up 0.4% and 0.3% and 0.5% respectively in the total landings. While landings of bony fish species was 98.81%. The average landings per month for sharks, rays and skates were 659.9 kg, 491.3 and 929.7 kg respectively. The highest landing by month for sharks was 3,894.9 kg in June, followed by 2,550 kg in May. The highest landing of rays

Table 1. Checklist of sharks, rays and skates species recorded during the study period

No.	Order/Families/species	Name	Ba Ria - Vung Tau	Binh Thuan
I	SHARKS		24	14
	CARCHARHINIFORMES			
	Carcharhinidae			
1	*Carcharhinus amblyrhynchos* (Bleeker, 1856)	Grey reef shark	+	
2	*Carcharhinus* cf. *falciformis* (Müller & Henle, 1839)	Silky shark	+	
3	*Carcharhinus dussumieri* (Müller & Henle, 1839)	Whitecheek shark	+	+
4	*Carcharhinus plumbeus* (Nardo, 1827)	Sandbar shark	+	+
5	*Carcharhinus limbatus* (Müller & Henle, 1839)	Common blacktip shark	+	+
6	*Carcharhinus sorrah* (Müller & Henle, 1839)	Spottail shark	+	+
7	*Carcharhinus* sp.			+
8	Galeocerdo cuvier (Person & Lesueur, 1822)	Tiger shark	+	
9	*Triaenodon obesus* (Rüppell, 1837)	Whitetip reef shark	+	
	Hemigaleidae			
10	*Hemigaleus microstoma* (Bleeker, 1852)	Sicklefin weasel shark	+	
	Scyliorhinidae			
11	*Atelomycterus marmoratus* (Anonymous [Bennett], 1830)	Coral catshark	+	+
12	*Atelomycterus baliensis* White, Last & Dharmadi, 2005	Bali catshark	+	+
13	*Cephaloscyllium sarawakensis* (Yano, Ahmad & Gambang, 2005)	Sarawak pygmy swell shark	+	
14	*Galeus* sp.			+
15	*Halaelurus buergeri* (Müller & Henle, 1838)	Blackspotted catshark	+	+
	Sphyrnidae			
16	*Sphyrna mokarran* (Rüppell, 1837)	Great hammerhead	+	
	Triakidae			
17	*Mustelus manazo* (Bleeker, 1855)	Starspotted smooth-hound	+	
	HEXANCHIFORMES			
	Hexanchidae			
18	*Heptranchias perlo* (Bonnaterre, 1788)	Sharpnose sevengill shark	+	
19	*Hexanchus griseus* (Bonnaterre, 1788)	Bluntnose sixgill shark	+	
	LAMNIFORMES			
	Alopiidae			
20	*Alopias pelagicus* (Nakamura, 1935)	Pelagic thresher	+	
21	*Alopias superciliosus* (Lowe, 1841)	Bigeye thresher		+

Table 1. Checklist of sharks, rays and skates species recorded during the study period (continue of page 34)

No.	Order/Families/species	Name	Ba Ria - Vung Tau	Binh Thuan
	ORECTOLOBIFORMES			
	Hemiscylliidae			
22	*Chiloscyllium plagiosum* (Anonymous [Bennett], 1830)	Whitespotted bambooshark	+	+
23	*Chiloscyllium punctatum* (Müller & Henle, 1838)	Brownbanded bambooshark	+	+
24	*Chiloscyllium* cf. *punctatum* (Müller & Henle, 1838)			+
25	*Chiloscyllium* sp.			+
	SQUALIFORMES			
	Centrophoridae			
26	*Centrophorus moluccensis* (Bleeker, 1860)	Smallfin gulper shark	+	
	Squalidae			
27	*Squalus megalops* (Macleay, 1881)	Shortnose spurdog	+	
	SQUATINIFORMES			
	Squatinidae			
28	*Squatina* sp.		+	
29	*Squatina tergocellatoides* (Chen, 1963)	Ocellated angelshark	+	
II	RAYS		29	31
	MYLIOBATIFORMES			
	Urolophidae			
30	*Urolophus aurantiacus* (Müller & Henle, 1841)	Sepia stingray	+	
	Dasyatidae			
31	*Dasyatis fluviorum* (Ogilby, 1908)	Estuary stingray		+
32	*Dasyatis parvonigra* (Last & White, 2008)	Dwarf black stingray		+
33	*Dasyatis sinensis* (Steindachner, 1892)	Chinese stingray	+	+
34	*Dasyatis* cf. *sinensis* (Steindachner, 1892)		+	+
35	*Dasyatis* sp.			+
36	*Dasyatis zugei* (Müller & Henle, 1841)	Pale-edged stingray	+	+
37	*Himantura imbricata* (Bloch & Schneider, 1801)	Bengal whipray	+	+
38	*Himantura jenkinsii* (Annandale, 1909)	Jenkins whipray	+	
39	*Himantura undulata* (Bleeker, 1852)	Leopard whipray	+	
40	*Himantura walga* (Müller & Henle, 1841)	Scaly whipray	+	+
41	*Himantura* cf. *javaensis* (Last & White, 2013)	Javan whipray		+
42	*Himantura* cf. *pastinacoides* (Bleeker, 1852)	Round whip ray	+	

Table 1. Checklist of sharks, rays and skates species recorded during the study period (continue of page 35)

No.	Order/Families/species	Name	Ba Ria - Vung Tau	Binh Thuan
43	*Maculabatis gerrardi* (Gray, 1851)	Sharpnose stingray	+	
44	*Neotrygon kuhlii* (Müller and Henle, 1841)	Blue-spotted stingray	+	+
45	*Neotrygon* sp.			+
46	*Pteroplatytrygon violacea* (Bonaparte, 1832)	Pelagic stingray	+	+
47	*Taeniurops meyeni* (Müller & Henle, 1841)	Round ribbontail ray	+	
48	Taeniura lymma (Forsskål, 1775)	Ribbontail stingray		+
49	*Urogymnus asperrimus* (Bloch & Schneider, 1801)	Porcupine whipray		+
	Gymnuridae			
50	*Gymnura japonica* (Temminck & Schlegel, 1850)	Japanese butterflyray		+
51	*Gymnura poecilura* (Shaw, 1804)	Long-tailed butterfly ray		+
	Myliobatidae		+	+
52	*Mobula thurstoni* (Lloyd, 1908)	Smoothtail mobula	+	
53	*Mobula japonica* (Müller & Henle, 1841)	Spinetail mobula	+	
54	*Mobula* sp.			+
55	*Aetobatus ocellatus* (Kuhl, 1823)	Ocellated eagle ray		+
56	*Aetomylaeus maculatus* (Gray, 1834)	Mottled eagle ray		+
57	*Myliobatis tobijei* Bleeker, 1854	Japanese eagle ray		+
	Pleisiobatidae			
58	*Plesiobatis daviesi* (Wallace, 1967)	Deep-water stingray	+	
	RHINOBATIFORMES Platyrhinidae			
59	*Platyrhina sinensis* (Bloch & Schneider, 1801)	Chinese fanray	+	+
60	*Platyrhina tangi* (Iwatsuki, Zhang & Nakaya, 2011)	Yellow-spotted fanray	+	+
	Rhinidae			
61	*Rhynchobatus australiae* (Whitley, 1939)	Bottlenose wedgefish	+	+
62	*Rhynchobatus palpebratus* (Compagno & Last, 2008)	Eyebrow wedgefish	+	
	Rhinobatidae			
63	*Rhinobatos formosensis* (Norman, 1926)	Taiwan guitarfish	+	+
64	*Rhinobatos* sp.		+	
	TORPEDIFORMES Narcinidae			
65	*Narcine brevilabiata* (Bessednov, 1966)	Shortlip electric ray	+	
66	*Narcine brunnea* (Annandale, 1909)	Brown numbfish	+	

Table 1. Checklist of sharks, rays and skates species recorded during the study period (continue of page 36)

No.	Order/Families/species	Name	Ba Ria - Vung Tau	Binh Thuan
67	*Narcine indica* (Bloch & Schneider, 1801)	Spotted numbfish	+	+
68	*Narcine* cf. *indica* (Bloch & Schneider, 1801)			+
69	*Narcine* sp.			+
70	*Narcine timlei* (Bloch & Schneider, 1801)	Spotted numbfish	+	+
	Narkidae			
71	*Narke dipterygia* (Bloch & Schneider, 1801)	Numbray		+
72	*Narke japonica* (Temminck & Schlegel, 1850)	Japanese sleeper ray	+	
III	SKATES RAJIFORMES		4	3
	Rajidae			
73	*Dipturus johannisdavisi* (Alcock, 1899)	Travancore skate	+	
74	*Dipturus kwangtungensis* (Chu, 1960)	Kwangtung skate	+	
75	*Okamejei cairae* (Last, Fahmi & Ishihara, 2010)	Borneo Sand Skate	+	+
76	*Okamejei hollandi* (Jordan & Richardson, 1909)	Yellow-spotted skate	+	+
77	*Okamejei* cf. *boesemani* (Ishihara, 1987)	Boeseman's skate		+
	TOTAL: 77 Species		57	48

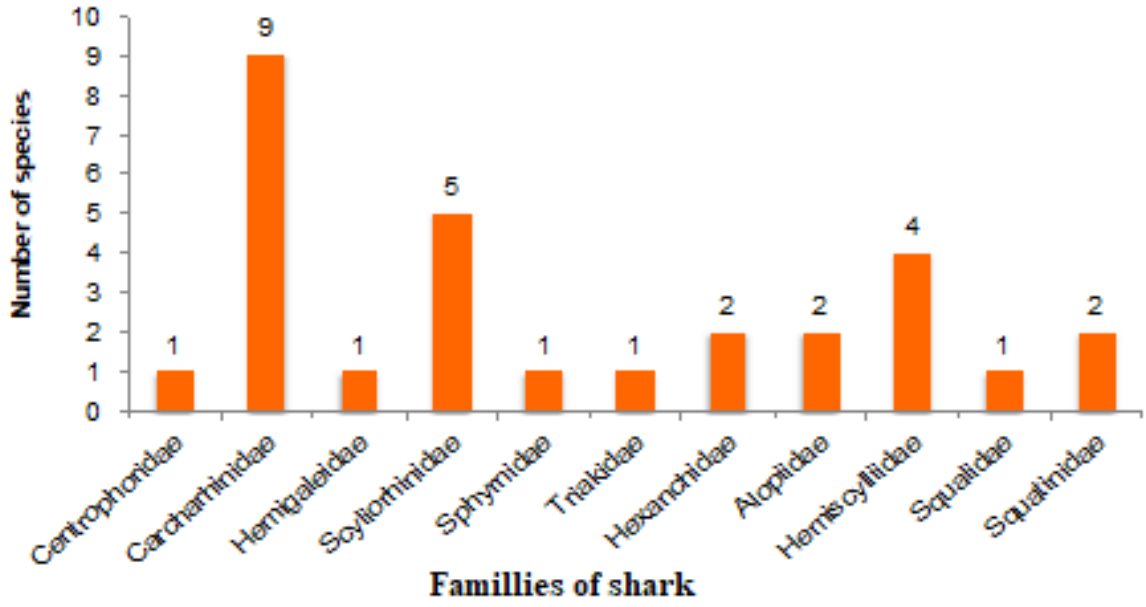

Figure 2. Number of species of shark families.

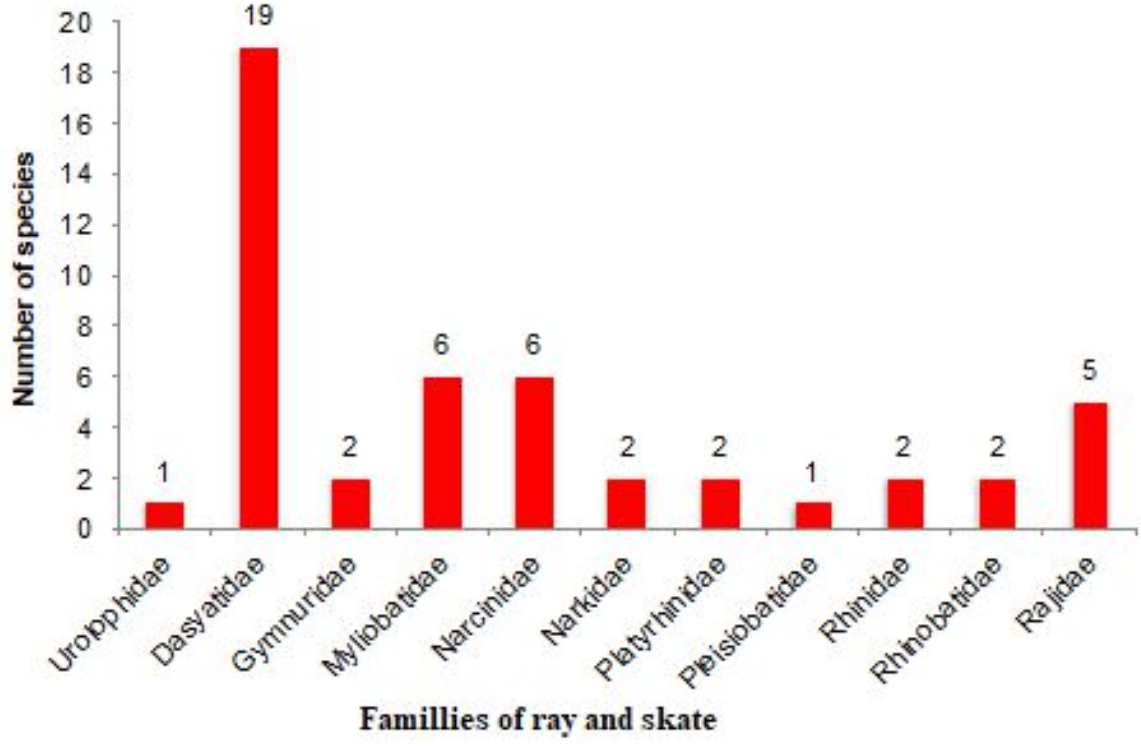

Figure 3. Number of species of shark families.

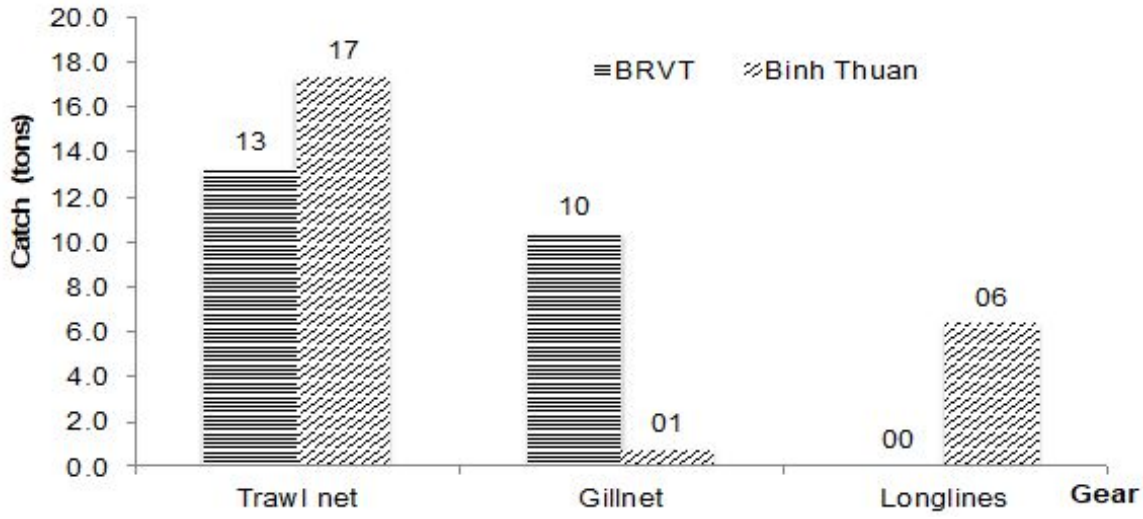

Figure 4. Sharks, rays and skates catch composition by gear type.

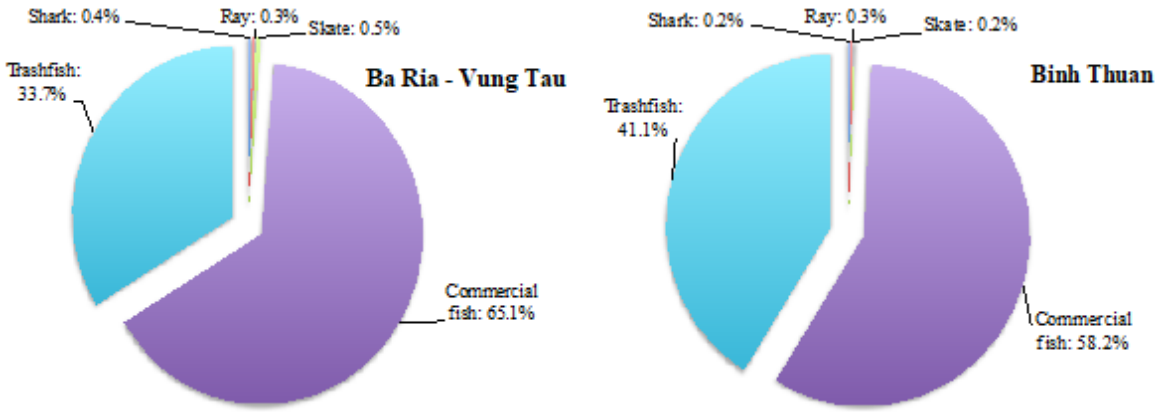

Figure 5. Sharks, rays and skates catch composition by gear type.

was 1,421.7 kg in October, followed by 1,046.9 kg in September, for skates was 1,798 kg in April, followed by 1,414 kg in January. The catch of sharks, rays and skates was under 1% in total catch of all fisheries in Binh Thuan province (Figure 5).

3.4. Weight of sharks, rays and skates by species

A total of 23,599.5 kg was landed in Ba Ria - Vung Tau province from 112 landings comprising 8,886.6 kg rays, 8,655.1 kg skates and 6,057.8 kg sharks. For rays, the highest landing by weight was *Mobula thurstoni*, followed by *Himantura jenkinsii*. For sharks, the highest landing was 10,810.73 kg for species of *Carcharhinus sorrah*, followed by 359 kg and 300 kg for *Carcharhinus limbatus* and *Galeus* sp. respectively. The highest landing weight of sharks by month was 3,871.2 kg of *Carcharhinus sorrah*, followed by *Chiloscyllium punctatum* was 779.2 kg. For skates, *Okamejei cairae* reached highest weight of 7,596.1 kg, the months of May, August, October and November was over 1,000 kg for the species.

In Binh Thuan province, total shark and ray species of 24,355.5 kg was landed from 133 landings, comprising 4,980.4 kg rays, 11,456.4 kg skates and 7,918.8 kg sharks. For rays, the

Table 2. Size range of sharks (Total length-TL), rays and skates (Disc length-DL) in Ba Ria - Vung Tau and Binh Thuan provinces from 2015 to 2016. All measurement in cm

Group	Ba Ria - Vung Tau province			Binh Thuan province		
	Max	Min	Average	Max	Min	Average
Shark (TL)	366.0	23.0	93.5 ± 62.1	366.0	21.0	96.8 ± 69.6
Ray (DL)	248.0	13.5	49.7 ± 43.8	127.0	11.0	48.0 ± 33.9
Skate (DL)	152.0	0.7 ± 34.0	26.4	58.0	11.0	30.7 ± 9.8

Table 3. Total operated days and total number of operations by gears sampled during the study period at Ba Ria - Vung Tau and Binh Thuan provinces in 2015 - 2016

Gears	Total operated days by gears in 2015 - 2016		Total number of operations by gears in 2015 - 2016	
	Ba Ria - Vung Tau	Binh Thuan	Ba Ria - Vung Tau	Binh Thuan
Gillnet	1,267	103	1,327	139
Trawl net	2,327	1,269	6,520	4,157
Longline	-	135	-	135
Total	3,594	1,507	7,847	4,431

highest landing by weight was *Himantura walga* amounted 1,586.5 kg, followed by 1,053.6 kg for *Himantura imbricata*. For sharks, the highest landing was 6,995.3 kg for species of *Carcharhinus sorrah*, followed by 329.5 kg and 300 kg for *Carcharhinus limbatus* and *Galeus* sp., respectively. For skates, *Okamejei cairae* reached highest weight of 9,904.8 kg, the months of from January to May and December was over 1,000 kg for the species.

3.5. Size range of sharks, rays and skates

In Ba Ria - Vung Tau province, the total length of sharks ranges from 23 cm to 366 cm (TL), reaching an average of 93.5 cm, rays have an average length of 49.7 cm in disc length (ranging from 13.5 cm to 248 cm) and skates have average length is 34 cm (DL). Also in Binh Thuan province, sharks have an average length of 96.8 cm (TL), rays are 48 cm (DL) and skate 30 cm (DL) (Table 2).

Most shark, ray and skate species landed in Ba Ria - Vung Tau province from January to May and from September to December were mature except to *Mobula thurstoni* (mature 198 cm). *Plesiobatis daviesi* (mature at 130 cm), *Atelomycterus marmoratus* (mature at 45 cm). *Carcharhinus limbatus* (mature at 120 cm), *Carcharhinus sorrah* matures at 103 - 128 cm (male) 110 - 118 cm (female). *Chilocyllium puctatum* matues at 68 - 76 cm. *Galeocerdo cuvier* matures at 300 - 305 cm for males and 250 - 350 cm for females (TL).

In Binh Thuan province, in general, all ray species sampled from January to May were mature. The most ray species landed from September to December were mature except for *Aetobatus ocellatus* (mature at 100 - 110 cm), *Gymnura poecilura* (mature at 45 cm). The most shark species landed from January, May and September to December were mature except for *Carcharhinus limbatus* (mature at 120 - 190 cm), *Carcharhinus sorrah* (mature at 103 cm), *Chiloscyllium plagiosum* (mature at 50 cm) and *Chilocyllium punctatum* (mature at 68 cm).

3.6. Fishing ground and fishing efforts

The main fishing grounds of shark, ray and skate vessels are in the Central and Southeast regions of Vietnam seawaters. In case of the gear of which annual effort excess 1000 days of operation or 1000 number of operations, CPUE (total of 12 months) was estimated by weight and number of individuals by species. Monthly fishing efforts (days at operation, total number of operation during the cruise) of the sampled vessels are summarized in Table 3.

4. Conclusion

A total of 77 species of sharks, rays and skates belong to 22 families and 10 orders are recorded in Ba Ria - Vung Tau and Binh Thuan provinces. Of these, 57 species were recored in BRVT and 48 species were found in Binh Thuan. The average species similarity index of sharks, rays and skates

is 0.50 in two study sites.

The *Carcharhinidae* family was found 9 species, *Dasyatidae* family identified 19 species and only one family of *Rajidae* of skate found 5 species. These families were recored the highest species number.

The total catch of sharks, rays and skates was 23,599 tons and 24,355 tons, respectively in Ba Ria - Vung Tau and Binh Thuan provinces.

The rate of sharks, rays and skates reached only from 0.2 to 0.5% in total catch landing from two sample locals.

The most abundant shark species in Ba Ria - Vung Tau are *Chiloscyllium punctatum*, *Carcharhinus sorrah* and *Atelomycterus marmoratus* while for rays are *Himantura walga*, *Himantura imbricata*, *Neotrygon kuhlii*, *Himantura jenkinsii* and *Dasyatis zugei*. The most common shark species are *Carcharhinus sorrah* while for rays *Himantura walga*, *Dasyatis zugei* and *Gymnura japonica*. The most abundant shark species in Binh Thuan are *Chiloscyllium punctatum*, *Carcharhinus sorrah* and for rays *Himantura imbricata*, *Dasyatis zugei* and *Himantura walga* and for skates, *Okamejei cairae*, *Okamejei hollandi*. Species of *Okamejei cairae* reached huge catch from trawl net from Lagi jetty of Binh Thuan province.

The total length of shark ranges from 21 to 366 cm, ray has disc length ranging from 11 to 248 cm and skate ranges from 0.7 to 152 cm in disc length.

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