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The Resources Information Series is a quarterly publication of Port Blair Base of Fishery Survey of India, Port Blair aimed to disseminate the fishery resources information collected through exploratory surveys in Andaman & Nicobar waters of Indian Exclusive Economic Zone (EEZ) to the fishing industry and other end-users.

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INTRODUCTION

The fishery survey vessel, *M.F.V. Blue Marlin*, a resource specific tuna longliner attached to Port Blair Base of Fishery Survey of India, Port Blair, adhering to the Fishery Resources Survey, Assessment and Survey Programme 2017-18 conducted the survey of oceanic tuna resources by deploying Regular Tuna Longline Gear (RTLL) and Deep Long line and the exploratory survey of Perch and allied resources by deploying Bottom set vertical longline (BSVLL) in Andaman and Nicobar waters, during the quarter ending June 2017.

VESSEL AND GEAR

The survey vessel MFV Blue Marlin has been envisaged for the survey programme in Andaman and Nicobar waters operated by the Port Blair base of Fishery Survey of India, Port Blair during the period. The Major specifications and other details of the vessel are furnished below.

MAJOR SPECIFICATIONS OF SURVEY VESSEL (a) AND FISHING GEAR (b):

a) Survey vessel : *M.F.V. Blue Marlin*

Specification

Length Overall (M)	:	35.76
Registered Length (M)	:	32.42
Breadth (M)	:	7.60
Depth (M)	:	3.10
Endurance	:	20 days
Gross Registered Tonnage (ton)	:	310
Net Registered Tonnage (ton)	:	93
Main Engine Power (BHP)	:	800 PS
Maximum Speed	:	11.87 Knots
Fuel tank capacity	:	111.04 m ³
Fresh water tank capacity	:	61.68 m ³
Fish hold capacity	:	117.18 m ³
Freezing room capacity	:	50.60 m ³
Bait room capacity	:	5.2 m ³
Year of Built	:	1989
Type of vessel	:	Tuna long liner
Official No.	:	F-BOM-0001
Call sign	:	VTSG
Port of Registry	:	Mumbai

(b) FISHING GEAR – (TUNA LONGLINE) SPECIFICATION

Sl. No.	Component	Specification / Material	RTLL (Regular Tuna Longline) (one basket)	DLL (Deep Set longline) (One Basket)	BSVLL (Bottom set vertical long line) (one basket)
1	Main line	6.7 Ø tetron	50m x 6 pieces	50m x 8 pieces 50m x 10 pieces	50m x 6 pieces
2	Branch line	4.5 Ø tetron	12.5m x 5 pieces	12.5m x 7 pieces 12.5m x 9 pieces	15m x 6pieces
3	Float line	6.7 mm tetron	25m x 1 pieces	25m x 1 pieces	As per depth of water
4	Swivel	Box type	05 pieces	07-09 pieces	05 pieces
5	Sekiyama	30 x 4 x 3 wire served with twine	10m x 5 pieces	10m x 7 pieces 10m x 9 pieces	----
6	Leader wire	30 x 4 x 3 wire	2.5 m x 5 pieces	2.5 m x 7 pieces 2.5 m x 9 pieces	75 cm monofilament guts
7	Tuna hook/	3.6 Sun with ring /	5 pieces	07-09 pieces	33 pieces
8	Float	300 mm Ø with single eye	1 piece Tuna Longline	1 piece	1 piece
9	Perch hook	No. 4 & 5 150 mm Ø with double eye	--	--	05 pieces Bottom Set Vertical Longline
10	Weight	3 Kg. cement block	--	--	05 pieces

PART-I

Survey of Oceanic Tuna and allied Resources using Regular Tuna Longline Gear in the of Eastern part of Andaman waters.

As a major part of the Fishery Resources Survey programme 2017-18, the survey of Oceanic Tuna and Allied Resources in the Eastern part of Andaman waters was programmed to understand the availability of stocks and their migratory pattern. Therefore, the survey vessel M.F.V. Blue Marlin was deployed to conduct the survey of Oceanic Tuna and allied resources in the Eastern part of Andaman waters during the month of April 2017 by deploying Regular Tuna longline gear (5 hooks/ Basket) covering the fishing areas of 10 squares (1°Lat × 1°Long) between Lat 10°N, 11°N, 12°N and 13°N and Long. 92°E, 93°E and 94°E. The vessel commenced her voyage on 10th April 2017 and concluded the voyage on 29th April 2017.

During the month, the vessel M.F.V Blue Marlin was out at sea for 19 days and conducted fishing on 13 days expending an effort of 8,125 hooks.

Table I

Area-wise and species- wise hooking rates (%) recorded during April 2017.

Area (Lat- Long)	Effort (No. of Hooks)	Total catch (Nos.)	Aggregate Hooking rate (%)	YFT	SHK	SWD	BAR	OTH
10°N/93°E	1250	3	0.24	--	0.08	---	0.08	0.08
10°N/94°E	1250	11	0.88	0.32	0.08	---	0.16	0.32
11°N/93°E	1875	7	0.37	0.11	0.08	0.08	0.11	0.08
11°N/94°E	1250	7	0.55	0.32	0.16	---	0.08	---
12°N/93°E	1250	4	0.32	---	--	---	0.08	0.24
12°N/95°E	625	2	0.32	0.16	--	0.16	--	---
13°N/93°E	625	2	0.32	---	--	--	0.32	---
TOTAL	8125	36	0.44	0.13	0.06	0.02	0.12	0.11

(YFT: Yellow fin Tuna, SHK: Sharks, SWD: Sword fish, BAR:Barracuda and OTH: Others)

Sardine (*Amblygaster sirm*) locally known as *Kappatharni* and Mackerel (*Rastrelliger kanagurta*) locally known as *Bhangdi* were used as bait during the voyage. The details of Area wise and species wise hooking rate are furnished in Table- I. During the survey period, an aggregate hooking rate of 0.44 % was obtained for all fishes.

Table: II

Percentage of Catch composition recorded (Nos. and Weight) during April 2017.

Species	Nos.	%	Wt (Kg.)	%
Yellow fin Tuna	11	30.56	230	48.73
Sharks	5	13.89	195	41.31
Sword fish	2	5.56	4	0.85
Barracuda	9	25	21	4.45
Others	9	25	22	4.66
Total	36	100	472	100

The percentage of Catch composition by Regular Tuna Longline (by Number and Weight) is furnished in Table II. From the table it is revealed that Yellow fin tuna dominated the catch by number and weight (30.56% and 48.73 %) respectively followed by Sharks (13.89% by number and 41.31% by weight) whereas Barracuda represented 25 %. by number and 4.45% by weight, while other fishes contributes 25 %. by number and 4.66 % by weight to the total catch.

Details of distribution of sampling effort (number of hooks), area coverage, aggregate hooking rate and hooking rate for Yellowfin Tuna, Sharks and Sword fish for April 2017 is depicted in the Fig 1.

Salient Observations:

1. The aggregate hooking rate recorded was 0.44 % for all fishes during the month of April 2017.
2. Yellow fin tuna dominated the catch by 0.13%, sharks 0.06 %, Sword fish 0.02%, Barracuda 0.11 % and others 0.12 %.
3. The area 10°N/94°E and 11°N/94°E were more productive for Yellowfin tuna.
4. A total of 36 nos. of fishes weighing about 472 kgs were recorded during the voyage.

PART-II

Survey of Bigeye Tuna and Allied Resources by using Deep Longline Gear in the Eastern part of Nicobar Waters.

Fishery Survey of India, Port Blair has designed a special gear called Deep long line gear (DLL) for exploring the big eye tuna resources in and around the Andaman and Nicobar Islands and has been experimenting in the deep sea of Andaman & Nicobar waters onboard MFV Blue Marlin for the past two decades. The survey methodology consisted of deployment of Deep long line gear (7 hooks/basket). Specification of gear is given on page no. 5.

During the month of May 2017 the survey vessel MFV Blue Marlin commenced her voyage on 11.05.2017 and concluded on 30.05.2017. During this month she was out at sea for 20 days and operated Deep long line gear (7 hooks/ Basket) for 14 days operating 8820 hooks. The vessel covered 11 squares (1°Lat × 1°Long) between Lat 06°N and 09°N and Long. 93°E and 95°E.

Table III

Area-wise and species- wise hooking rates (%) recorded during May 2017

Area (Lat-Long)	Effort (No. of Hooks)	Total catch (Nos.)	Aggregate Hooking rate (%)	YFT	SAIL	MAR	SWD	SHK	RAY	OTH
06°N/93°E	630	21	3.33	--	---		--	2.38	0.95	--
06°N/94°E	630	07	1.11	---	--		--	0.00	1.11	--
07°N/93°E	630	37	5.87	0.63	--		--	3.02	2.22	--
07°N/94°E	630	31	4.92	--	0.16		--	3.49	1.27	--
07°N/95°E	630	11	1.75	--	--		--	0.63	1.11	--
08°N/93°E	630	17	2.70	--	--		--	1.75	0.95	--
08°N/94°E	630	12	1.90	--	0.32		--	0.16	1.43	--
08°N/95°E	630	09	1.43	0.16	--		--	1.11	0.16	--
09°N/93°E	2520	36	1.43	--	0.08	0.04	0.08	0.75	0.44	0.04
09°N/94°E	630	07	1.11	--			--	0.16	0.63	0.32
09°N/95°E	630	09	1.43	0.16			--	0.79	0.48	---
TOTAL	8820	197	2.23	0.06	0.05	0.01	0.02	1.17	0.86	0.03

(YFT: Yellowfin Tuna, SWD: Sword Fish, SAIL: Sail Fish, MAR: marlin; SHK: Sharks, RAY: Rays, OTH: Others)

Sardine (*Amblygaster sirm*) locally known as *Kappatharni* and Mackerel (*Rastrelliger kanagurta*) locally known as *Bhangdi* were used as bait during the voyage. The details of Area wise and species wise hooking rate are furnished in Table- III. During the survey period, an aggregate hooking rate of 2.33% was obtained for all fishes.

Table: IV

Percentage of Catch composition recorded (Nos. and Weight) during May 2017

Species	Nos.	%	Wt (Kg.)	%
Yellow fin Tuna	6	3.05	52	1.28
Shark	104	52.79	3458	85.45
Sail fish	05	2.54	130	3.21
Marlin	01	0.51	100	2.47
Sword Fish	02	1.02	135	3.34
Rays	76	38.58	163	4.03
Others	3	1.52	9	0.22
Total	197	100	4047	100

The percentage of Catch composition of Deep Longline fishing by Number and Weight is furnished in Table IV. From the table, it can be seen that Sharks dominated the catch by number (52.79 %) and weight (85.45) followed by Rays (38.58% by number and 4.03% by weight). Yellow fin tuna represented 3.05% of catch by number and 1.28% by weight. Sail fish constituted 2.54% of total catch by numbers and 3.21% by weight.

Details of distribution of sampling effort (number of hooks), area coverage, and aggregate hooking rate for Yellowfin Tuna, Sharks and Sword fish were depicted in the Fig – II.

Salient Observations:

1. During the month of May 2017, aggregate hooking rate recorded was 2.23 % for all fishes.
2. Sharks dominated the catch; recording hooking rate of 1.17%, followed by rays (hooking rate 0.86%), yellow fin tuna (hooking rate 0.06%) and sail fish (hooking rate 0.05%).
3. The area 07°N/93°E and 07°N/94°E found to be more productive in terms of aggregate hooking rate of 5.87 and 4.92 % (all fishes) and 3.02 and 3.49% (Sharks).

PART-III

Bottom Set Vertical Longline gear deployed by Fishery Survey of India in and around Andaman Group of Islands.

The perches (comprising of Groupers, Snappers and Emperors) are the major fishery resources contributing more than 40% of total landings in Andaman and Nicobar Islands and fetches high value in local market as well as from exports. It is a prerequisite to estimate the perch fishery resources potential of rocky, coral bank areas of sea mounts of Andaman and Nicobar Islands. Hence, the Fishery Survey of India, Port Blair has designed a special gear called Bottom set vertical longline gear (BSVLL) and has been experimenting on the sea mounts of Andaman and Nicobar waters on board MFV Blue Marlin for the past two decades. The survey methodology consisted of deployment of Bottom set vertical longline gear (30 hooks/basket). Specification of the gear is given in Major specification of vessel and gears.

The survey vessel M.F.V. Blue Marlin commenced her voyage on 10th June 2017 and concluded her voyage on 29th June 2017. During the month, the vessel surveyed areas of Lat 11°N, 12°N and 13°N and Long. 92°E and 92°E for 20 days by operating Bottom set vertical longline gear for 17 days. A total of 10,410 hooks were operated in the above said area because the area is destined to emerge a good fishing ground for Perch resources. The details of Area wise and species wise hooking rate are furnished in Table-V.

Table V

Area-wise and species- wise hooking rates (%) recorded during June 2017

Area (Lat-Long)	Effort (No. of Hooks)	Total catch in (Nos.)	Aggregate hooking rate (%)	Snapper (<i>Lutjanidae</i>)	Grouper (<i>Serranidae</i>)	Emperors (<i>Letherinidae</i>)	Others
11°N/92°E	1890	9	0.48	0.32	0.11	0.05	--
11°N/93°E	1260	1	0.08	0.08	--	--	--
12°N/92°E	630	5	0.79	0.63	--	--	0.16
12°N/93°E	5970	64	1.07	0.97	0.07	--	0.03
13°N/93°E	630	9	1.36	1.21	0.15	--	--
TOTAL	10,410	88	0.85	0.74	0.07	0.01	0.03

Sardine (*Amblygaster sirm*) locally known as *Kappatharni* and Mackerel (*Rastrelliger kanagurta*) locally known as *Bhangdi* were used as bait during the voyage.

During the month an aggregate hooking rate of 0.85% was recorded. Among the Perches, Snappers dominated the catch with a hooking rate of 0.74%, followed by Grouper 0.07% and Emperor

0.01%. A total of 88 numbers of fishes representing Snappers, Groupers and Emperors weighing about 157.300 kg were caught during the voyage.

Table VI

Percentage of Catch composition recorded (Nos. and Weight) during June 2017

Species	Nos.	%	Wt (Kg.)	%
Snappers	77	87.5	149.350	94.95
Groupers	7	8.0	0.750	0.48
Emperors	1	1.1	0.50	0.32
Others	3	3.4	6.700	4.26
Total	34	100	48.55	100

The percentage of Catch composition by Bottom set vertical longline by (Number and Weight) is furnished in Table VI. From the table it is depicted that Snappers dominated the catch by number (87.5%) and weight (94.95%), followed by Groupers by number (8.0%) and weight (0.48 %) and emperors by numbers (1.1%) and by weight (0.32%).

Details of distribution of sampling effort (hooks), area coverage and aggregate hooking rate are depicted in the Fig - III

Salient Observations:

1. The aggregate hooking rate recorded was 0.85 % for all fishes during the month of June 2017.
2. Snappers dominated the catch with a hooking rate of 0.74 % followed by Groupers with 0.07% and emperor 0.01 % respectively.
3. A total of 88 fishes weighing about 157.300 kgs. were recorded during the voyage.

Bumper catch of sharks in Nicobar waters

During the month of May 2017, MFV Blue Marlin carried out survey in the Nicobar waters for bigeye tuna resources by deploying Deep longlining (7 hooks/ basket). During the voyage, a total number of 104 sharks comprising of 04 species were hooked. The shark catch was dominated by pelagic thresher, (*Alopias pelagicus*) 95 number of specimen weighing 2,963 Kg with total length (TL) ranging from 164 to 361 cm. The other shark species recorded were *Alopias superciliosus* 06 Nos; size ranging (TL) from 104-302 cm weighing 335 Kg; *Galeocerdo cuvier* (02 number; size ranging (TL) from 191-242 cm, weighing 120 Kg), and *Isurus oxyrinchus* (01 number, TL from 140 cm weighing 40 Kg. Highest hooking rate (3.49%) were obtained from the area 07°N/94°E, followed by area 07°N/93°E (3.01%) and 08°N/93°E (1.74%). A total of aggregate hooking rate 2.23 % was recorded during his month.



Plate : Pelagic Sharks and Sailfish caught in one set during May 2017 voyage of MFV Blue Marlin

Communicated by: Shri Pratyush Das, Junior Fishing Gear Technologist, Port Blair Base of FSI.

Occurrence of gravid scalloped hammerhead (*Sphyrna lewini*) from Andaman waters

/The scalloped hammerhead shark *Sphyrna lewini* (Griffith & Smith, 1834) is a coastal and semi-oceanic species globally distributed in temperate and tropical seas. Maximum size reported for this species ranges from 219 to 340 cm TL for males and 296-346 cm for females. The mode of reproduction in *S. lewini* is viviparous with a yolk-sac placenta. The females had only one functional ovary, the right attached to the anterior end of the epigonal organ. The left ovary was rudimentary, small and without ova. The ovarian eggs passed through the common ostium into the oviducts,

where they fertilized and encased into an embryonic membrane to pass to the oviducal gland. Further, it descends into the uterus where the embryonic development occurs. The oviducal gland produces a thin membrane to separate the embryos for their individual development in the uterus.

Information on the reproductive biology as well as habitat of this endangered species from Andaman Sea is meager. During April 2017 voyage of MFV Blue Marlin, a parturient specimen of *S. lewini* having a total length (TL) of 244 cm was caught from the Eastern part of Andaman Sea from Lat. 11°22' N and Long. 93°14' E. In the present observation, all embryos (22 No's) were ready to be born and one embryo was found dead (Fig 1C) and in degenerating stage. Newborn size reported in earlier studies ranges from 31-57 cm and the average length of the pups in the present specimen is 40.2 cm indicating readiness for the parturition. Detailed studies on the recruitment and stock structure of this species in Andaman waters are very essential for the conservation of this endangered species.

Communicated by: Shri Nashad M., Senior Scientific Assistant, Port Blair Base of FSI



Plate: Pregnant *Sphyrna lewini* caught onboard MFV Blue Marlin. A) Body cavity cut open to remove the uteri B) Embryo C) Dead and degenerating embryo recovered from uterus

3. Notes on the occurrence of the longfin mako, *Isurus paucus* Guitart Manday, 1966 in the Andaman and Nicobar waters

The longfin mako, *Isurus paucus* is an oceanic shark species in the family Lamnidae, found in temperate and tropical waters of the world oceans (Froese & Pauly 2017). The species is characterized by pectoral fins about as long as head or longer, relatively broad-tipped in young and adults; snout usually narrowly to bluntly pointed, usually not acute; cusps of upper and lower anterior teeth straighter, with tips not reversed. The body colour is dark blue above, white below, with dusky markings on underside of snout, around mouth (Froese & Pauly 2017). In India, the species is being recorded from the Arabian Sea (Varghese et al., 2015). A single specimen of *Isurus paucus* was hooked during the May 2017 voyage of MFV Blue Marlin at a depth of 1837m from the area 93°. The collected specimen was an immature female with a total length of 184 cm, weighing 40 kg. A survey of the available literature indicates that the longfin makos are not so far reported from the Andaman and Nicobar waters and therefore the present report will be the first documented report of this species from this area.



Plate: Longfin mako, *Isurus paucus* caught onboard MFV Blue Marlin during May 2017

Communicated by: Shri Pratyush Das, Junior Fishing Gear Technologist, Port Blair Base of FSI.