



DISTRIBUTION, ABUNDANCE AND BIOLOGY OF INDO PACIFIC
SAILFISH, *ISTIOPHORUS PLATYPTERUS* (SHAW AND NODDER,
1792) IN THE INDIAN EEZ AROUND ANDAMAN AND NICOBAR.



L. Ramalingam and A.B.Kar



The tuna long line survey results in the Indian EEZ around Andaman and Nicobar waters shows that tunas, billfishes and sharks are the three major groups of fishes caught in the longline gears. Among them the average annual landings of bill fish is 232 tonnes . Among the bill fishes the Indo pacific sail fish, *Istiophorus platypterus* has appreciable importance in Andaman waters. The sailfishes are exclusively the by-catches of tuna fishery and there is no aimed commercial fishery exists for the species in the Island groups.



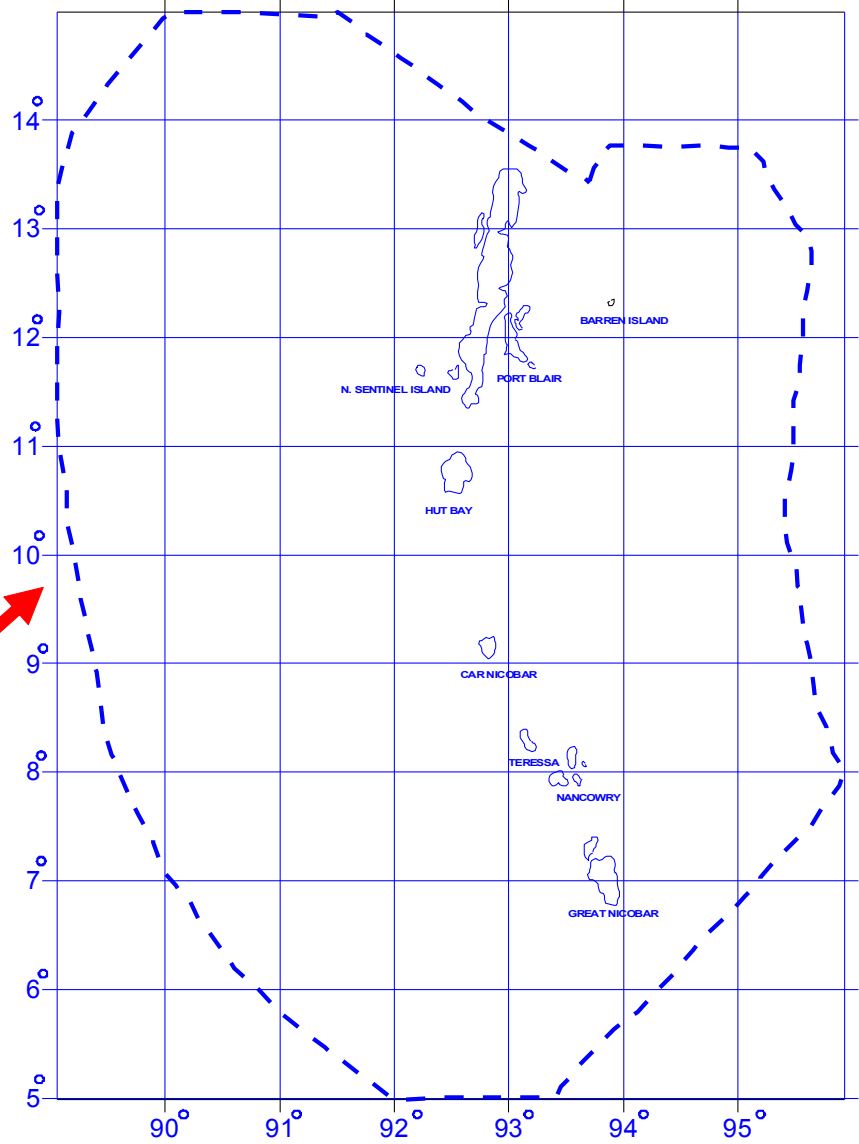
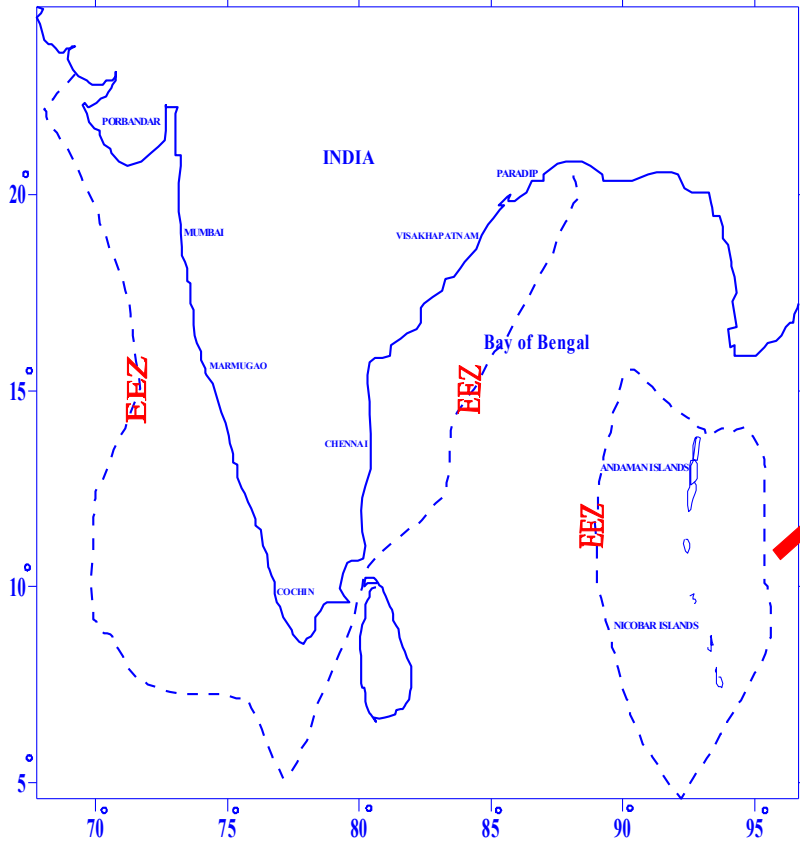
Very limited work has been done on the distribution and biological aspects of the species. Hence an attempt has been made in the present paper to study the distribution pattern , abundance and some biological aspects such as length frequency, length weight, sex ratio, maturity and spawning and food and feeding habits of the species by analyzing the longline data collected onboard MFV Blue Marlin during the period 2000-2010.

ANDAMAN AND NICOBAR ISLANDS

- ❖ Total Area : 8149 Sq Kms.
- ❖ Total Islands Including Islets, Reefs and Rocks): 572
- ❖ Total inhabited islands : 38
- ❖ Coastline of A&N Islands :1962 Kms.
- ❖ Territorial waters :upto 12 Nautical miles.
- ❖ Coral Reef Area :about 2,000 Sq.Kms.
- ❖ Exclusive Economic Zone : 0.6 million km²
(About 1/3rd EEZ of India)
- ❖ Continental shelf : 35,000 km²

EEZ of Andaman & Nicobar.

Fig.1. Exclusive Economic Zone of India.




Material and Methods

The data of sailfish caught in the multifilament tuna longline surveys conducted by FSI in the EEZ of Andaman and Nicobar waters by the survey vessel MFV Blue Marlin during the period 2000-2010 was analysed. The survey was carried out in the latitude 6°-14° and longitude 89°-95°E. The fishing gear operated for the study was the multifilament tuna long line gear with 5/7 hooks per basket. Everyday 625 hooks were operated and an average of 14 operations were made per voyage.

Gear configuration(1 basket)

Main Line	6.7 Ø tetron	50m x 6 pieces
Branch line	4.5 Ø tetron	12.5m x 5 pieces
Swivel	Box type	05 pieces
Sekiyama	30 x 4 x 3 wire served with twine	10m x 5 pieces
Leader wire	30 x 4 x 3 wire	2.5m x 5 pieces
Tuna hook	3.6 Sun with ring	5 pieces
Float line	Tetron	25m x 1 piece
Float	300mm Ø with single eye	1 piece



For morphometric data analysis, the linear equation ($Y = a + b X$) was fitted for males and females separately.

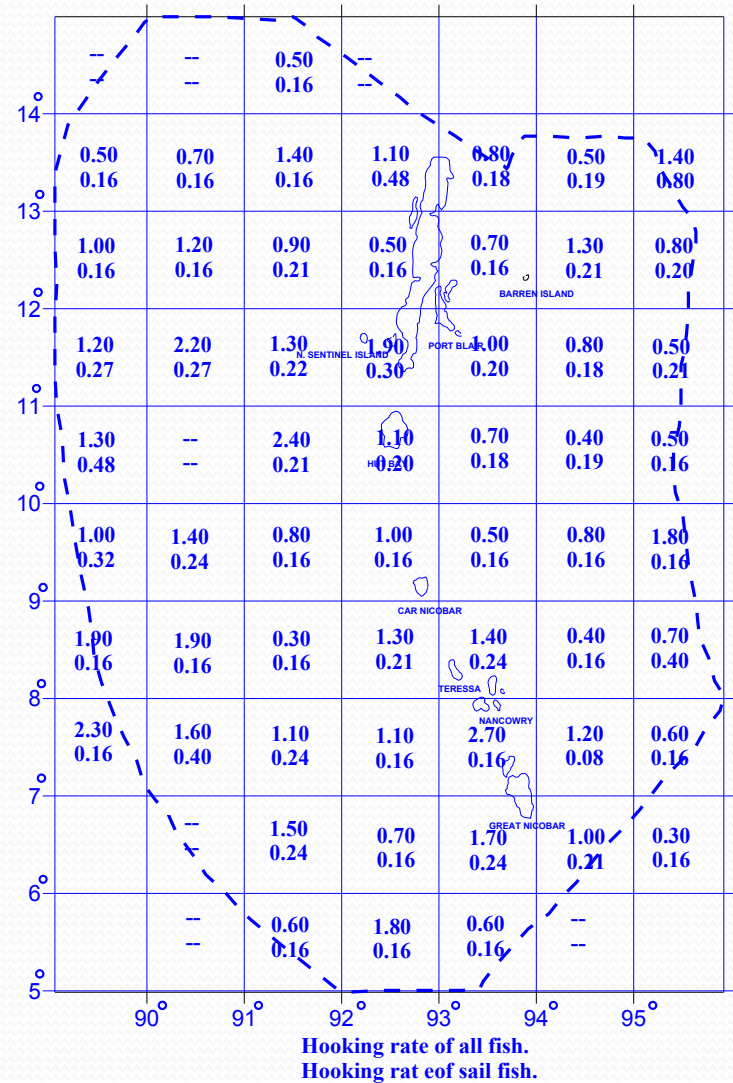
The length-weight relationship $W = a L^b$ (Le Cren, 1951) was used, where 'W' is the weight in kilograms (kg) and 'L' is the total length in centimeter (cm).

Spawning period is obtained by calculating the gonad index.


Results

In the present study it could be seen that the average aggregate hooking rate (%) for all fishes in Andaman and Nicobar waters recorded was 0.65% and the average aggregate hooking rate of sailfishes recorded was 0.03%. The seasonal variation showed that the aggregate hooking rate for all fishes varied from 0.44% to 1.05% with a maximum during January(1.05%) and the average hooking rate of sailfish varied from 0.01% to 0.06% with a maximum during the month of June and November(0.06%).

Abundance Indices(Hooking rate in %) in 1° Lat 1°Long.
of all fishes and sail fish during 2000-2010.



The average hooking rate of sailfish recorded was in between 0.08% to 0.80%. The abundance of sailfish found to be more in the square 13°/95°(0.80%) followed by 0.48% in 13°/92° and 10°/89° and 0.40% in 07°/90° and 08°/95°.



The male specimens were recorded in the length range of 113-230cm fork length with dominance at 161-180 cm range and the female specimens were recorded in the length range of 133-250 cm fork length with dominance at 180-200 cm range.

The Morphometric Relationships are

Male

$$FL = 3.0 + 0.85 TL (r = 0.99)$$

$$HL = 1.3 + 0.19 TL (r = 0.98)$$

$$(S-2D) = 18.7 + 3.3(S-1D) (r = 0.92)$$

$$(2D-A) = 6 + 0.45(1D-A) (r = 0.90)$$

Female

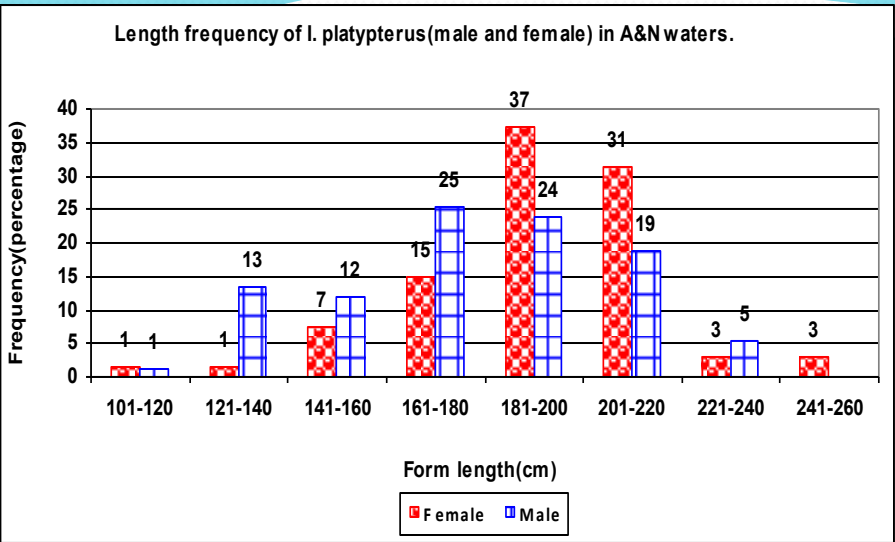
$$FL = 0.29 + 0.87 TL (r = 0.98)$$

$$HL = 1.69 + 0.19 HL (r = 0.97) T$$

$$(S-2D) = 13.3 + 3.3(S-1D) (r = 0.94)$$

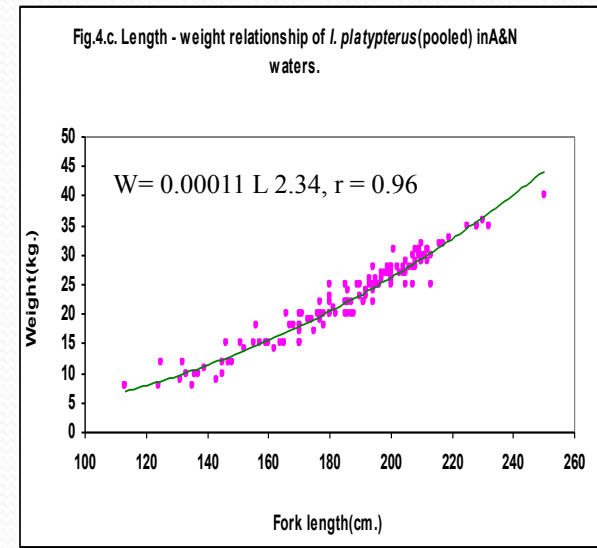
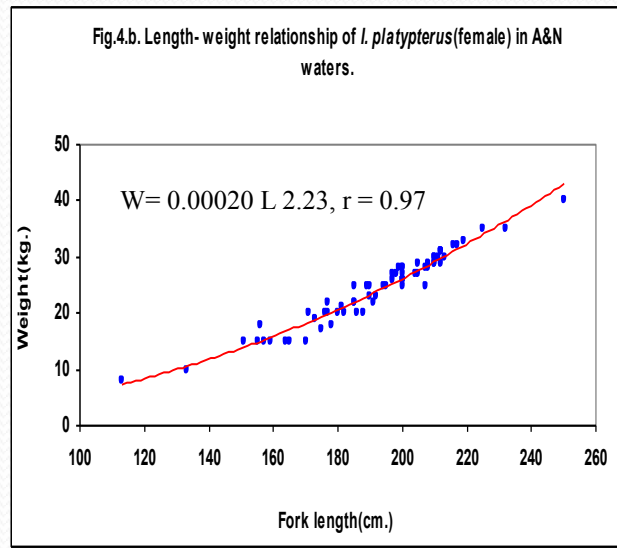
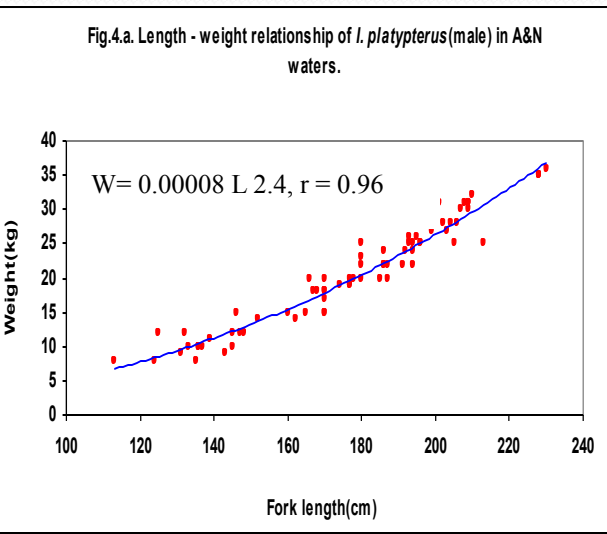
$$(2D-A) = 5.5 + 0.51(1D-A) (r = 0.87)$$

Size Frequencies



The percentage of male was more on the size range 161-180cm (19%) followed by 181-200 cm (18%). The females were dominated in the size range 181-200cm (25%) followed by 201-220 cm (21%).

Length – weight relationship



Size wise sex ratio of *Istiophorus platypterus* in A&N waters

Fork length range (cm)	Male	Female	Sex ratio (M:F)	Chi square
101-120	1	1	1:1.0	0
121-140	7	4	1:0.6	0.4
141-160	11	5	1:0.5	1.1
161-180	19	10	1:0.5	1.4
181-200	18	25	1:1.4	0.6
201-220	14	18	1:1.3	0.3
221-240	4	2	1:0.5	0.3
241-260	1	2	1:2.0	0.2
Total	75	67	1:0.89	0.2

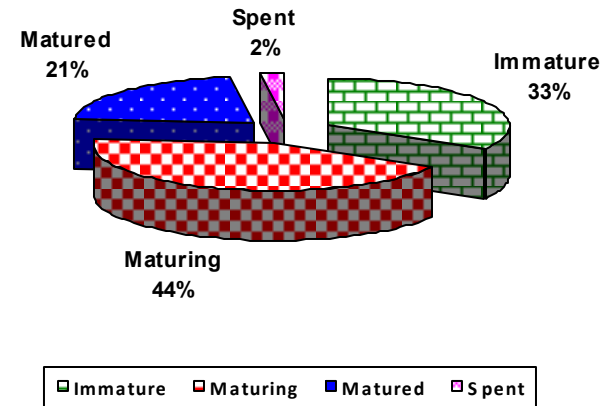
The over all sex ratio (M : F) of Sailfish obtained was 1 : 0.89

Month wise sex ratio and Chi square value of *Istiophorus platypterus* in A& N waters

Months	Male	Female	Sex ratio (M:F)	Chi square
January	5	17	1:3.4	3.3
February	8	4	1:0.5	0.7
March	3	2	1:0.7	0.1
April	2	3	1:1.5	0.1
May	3	2	1:0.7	0.1
June	8	12	1:1.5	0.4
July	4	2	1:0.5	0.3
August	2	3	1:1.5	0.1
September	6	7	1:1.2	0.1
October	10	4	1:0.4	1.3
November	16	3	1:0.2	4.4
December	8	8	1:1	0.0
Total	75	67	1:0.89	0.2

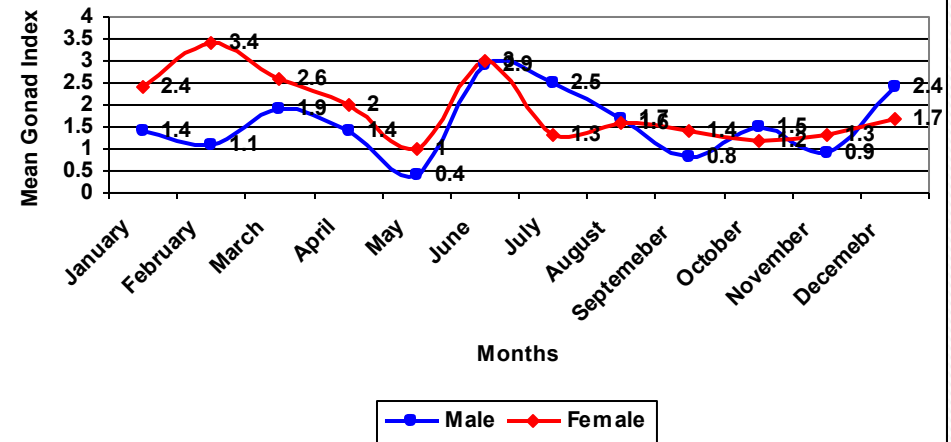
Maturity studies indicated that 33% of the species were immature followed by 44% maturing, 21% fully mature and 2% spent.

Fig. 5. Gonad maturity stages of *I. platypterus* in A&N waters.



spawning occurs between December to June with a peak in February and June.

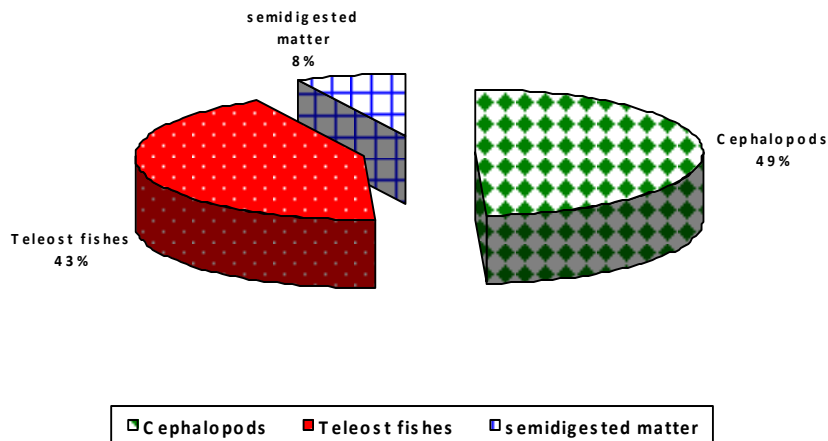
Gonad Index of *I. platypterus* in A&N waters



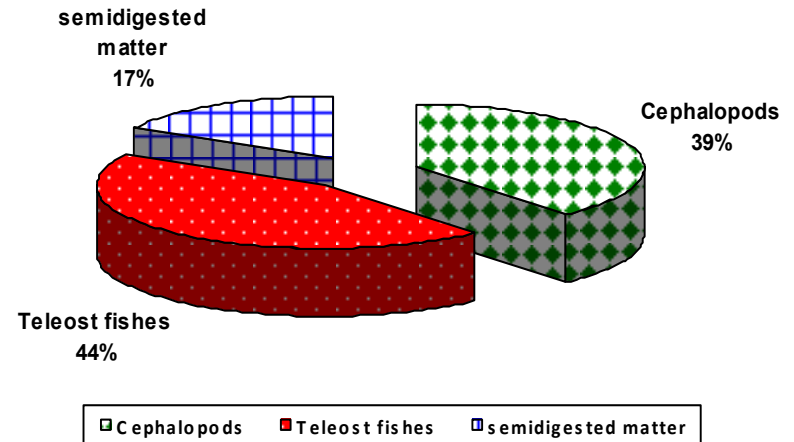
Food and feeding

The food and feeding study showed that the cephalopod constituted maximum of 49% followed by the teleost fishes(43%) in males where as in case of females, the teleost fishes constituted the maximum of 44% followed by cephalopods(39%).

Food composition of *I. platypterus*(male) in A & N waters.



Food composition of *I. platypterus*(female) in A&N waters.



Salient findings

- ❖ The average aggregate hooking rate (%) for all fishes in Andaman and Nicobar waters recorded was 0.65% and the average aggregate hooking rate of sailfishes recorded was 0.03%.
- ❖ The abundance of sailfish found to be more in the square $13^{\circ}/95^{\circ}$ (0.80%) followed by 0.48% in $13^{\circ}/92^{\circ}$ and $10^{\circ}/89^{\circ}$ and 0.40% in $07^{\circ}/90^{\circ}$ and $08^{\circ}/95^{\circ}$.
- ❖ The seasonal variation showed that the hooking rate of sailfish varied from 0.01% to 0.06% with a maximum of 0.06% during the month of June and November followed by 0.05% during the month of August.
- ❖ The male specimens were recorded in the length range of 113-230cm fork length with dominance at 161-180 cm range and the female specimens were recorded in the length range of 133-250 cm fork length with dominance at 180-200 cm range.

- ❖ In the present study the length weight relationship for the pooled data was $W=0.00011 L^{2.34}$ ($r = 0.96$)
- ❖ The male to female ratio was found to be 1:0.89.
- ❖ spawning occurs between December to June with a peak in February and June.
- ❖ In the present study, four maturity stages could be observed in Andaman waters viz. Immature, Maturing, Mature, & Spent.
- ❖ The gut content analysis showed that cephalopod constituted maximum of 49% followed by the teleost fishes(43%) in males where as in case of females, the teleost fishes constituted the maximum of 44% followed by cephalopods(39%) which shows its sex wise desirable feeding habits

Conclusion

- ❑ Among the bill fishes the Indo pacific sail fish, *Istiophorus platypterus* has appreciable importance in Andaman waters.
- ❑ Availability of information on the biology of the sailfish in this region is less.
- ❑ priority should be given for more elaborate studies on the biological characteristics of the species like age, growth, food and feeding, spawning, and stock position of this group.



Thank You