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Research Article

Abundance of tuna fish species in the Bay of Bengal of Bangladesh region

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Abstract

The study was conducted from July, 2012 to June, 2013 and 7 tuna fish species were recorded of Bangladesh marine territory, mainly South Patches & Middle ground areas, in artisanal and industrial fishing sector respectively. These seven species are, *Auxis thazard*- Frigate tuna (Lacepede, 1800), *Auxis rochei* -Bullet tuna (Risso,1810), *Euthynnus affinis* -Eastern little tuna / kawakawa(Cantor, 1849), *Thunnus albacares* -Yellow fin tuna (Bonnaterre,1788), *Thunnus obesus* -Big eye tuna (Lowe, 1939) *Thunnus tonggol*- Long tail tuna (Bleekar, 1851) and *Katsuwonus pelamis* - Skipjack tuna (Linnaeus, 1758). Maximum number of small sizes of *Katsuwonus pelamis*, *Thunnus tonggol* and *Auxis rochei* are harvested in deep sea fishing and *Euthynnus affinis*, *Auxis thazard* and *Thunnus obesus* are exploited by gill nets and hooks & lines in coastal water areas as by catch and incidentally *Thunnus albacares* caught in fish trawl and hooks & lines also. A total 2227.471 MT of tuna fish were landed, on which 1624.51 MT (72.93%) harvested in the offshore water within 16749 days by 138 numbers of different fish trawler and the rest 602.961 MT (27.07 %) was captured in onshore water by 6789 numbers of mechanized boat within 178 fishing days. In industrial fishing, highest landing observed in the month of March, 2013 and lowest in May, 2013 and in small scale fishing maximum and minimum landing recorded from BFDC fish harbor, Cox's Bazar in the month of November, 2012 and May, 2013 respectively. Average CPUE in industrial and artisanal fishing were 96.99 kg and 88.81kg respectively. In commercial trawl fishing, percentage contribution of landed tuna was only 2.35% of the total fish landing and in small scale fishery at BFDC fish harbor; tuna contributed only 8.21% of the total landed fish at same study period.

Keywords: Tuna fish, Total landing, CPUE, BFDC fish harbor, percentage contribution & Middle ground

Introduction

The Bay of Bengal is situated at the Southern end of Bangladesh between latitude 20° 34' and 26°38' North and longitude 88°1' and 92°41' East. In these areas operate fleets of small scale fishing craft and gear such the motorized boats, gill nets, hooks & lines (long lines), set bag nets, trammel net, beach

seines and etc. About 27000 numbers of mechanized and 25000 non-mechanized boats are exploiting in the inshore water areas up to 40 meters (m) depth zone and about 138 nos. of different types of commercial fish trawlers are harvesting beyond 40m depth zone to offshore water of Bangladesh marine territory.

The Bay has a typical multi species and multi gears fisheries resource. But, there is at present no tuna fishery, which is engaged solely in harvesting tuna & tuna like fishes in Bangladesh. But recently Govt. has given permission of five Purse seines to harvest the tuna & tuna like fishes, after 2 years operation these are closed. Tuna fishes are captured as by catch, mainly by drift gill nets and hooks & lines operating mainly South-East & North-West part of the Bay of Bengal at Cox's Bazaar base and in Mid-water trawl as by catch and incidentally others fish trawl also. Among the surveys of the Bangladesh-Thai joint venture, however, mentioned a good abundance of large Pelagic i.e. tuna & tuna like fishes and shark in Bangladesh marine water (Rahman, 1993).

The term tuna derives from *Thunnus*, the Middle Latin form of the Ancient Greek: (thynnos) "tunny-fish"- which is in turn derived from (thyno), "to rush: to dart". The "true" tunas are those that belong to the genus *Thunnus* (SPC, 2012). Tunas are among the largest, most specialized and commercially important of all fishes (Collette, 1983). Belonging to the genus *Thunnus* of the family Scombridae, they are found in temperate and tropical oceans around the world and account for a major proportion of the world fishery products.

Of the 16 species under IOTC management, 9 are tuna, 2 are mackerel and 5 are billfish species. The tuna species which are the target of the large industrial fleets are the yellow fin tuna, skipjack, big eye & albacore. Global tuna production has tended to increase continuously from less than 60,000t in 1950 to above 6,000,000t in 2010. The Indian Ocean currently provides about 20% of the global tuna catch. The tuna resources of the Indian Ocean are the 2nd largest in the world and make a significant contribution to food security throughout the region. The Indian Ocean tuna economy is estimated by some to be worth 6 billion USD (IOTC, 2013).

Acoustic estimates of the biomass of pelagic fish over the shelf covered were 38,000 t in November-December 1979 and 76,000 t in May 1980. The shelf

area inside 10 m depth which could not be covered by the surveys is very extensive which is about 7,000 nm. If it is assumed that the density of pelagic fish here was the same as in the area between 10 and 100 m depth (about 9,400 nm.) where the pelagic fish was observed, then raised totals of 66,000 t in November-December and 133,000 t in May would represent the whole Bangladesh shelf. During R.V. Dr. Fridtjof Nansen survey 1979 (Saetre, 1981) through an acoustic study the pelagic stock estimated to be from 60,000 mt. to 1, 20,000 mt. these are likely to be underestimates because of the generally negative bias of the first generation of acoustic equipment. In another survey, Lamboeuf (1987) estimated at 25,600 MT standing stock of Pelagic fish. Most gillnets are drivel gillnets operated within 20-24 meter depth and catch mostly hulas as target species associated by tuna, mackerel, sharks etc. as incidental catch (Rahman.1993).

So far, no survey have been done solely to explore, assess and to exploit the tuna and tuna like resources particularly in the EEZ of Bangladesh. However, the results of the survey No.2 (1979) and R.V. Dr. Fridtjof Nansen, 1979-1980 (Saetre, 1981) indicate the presence of some species of tuna and tuna like fishes in the EEZ of Bangladesh. In 1979 during the Thai-Bangladesh joint survey with R.V. Research No.2, offshore drift netting experiments showed that the composition of tuna and tuna like fishes in the drift nets are more than 50% containing seven species of tuna and skipjack and also a number of mackerel recorded. There are 7 tuna species and 4 species of mackerel reported from the Bangladesh continental shelf (Khan, 1992). They are either not exploited or exploited only as by catch or as incidental catches of the drift gillnet fisheries. These groups of fishes are not popular for food to the local people. They have high demand in the international market because of their falls taste and might protein content. Another survey conducted during 1979 recorded eight species of tuna and skip jack from Bangladesh marine water (Khan, 1995) but the abundance was not studied.

The Indian Ocean; having about 20% of the global tuna production, is the second largest proportion of principal tuna market in the world (FAO, 1997)

Japan, Taiwan and Korea are the major fishing countries in the Indian Ocean. Tunas are in great demand through out the world market due to their excellent meat quality (Chang, 1995 and FAO, 1997).

In Bangladesh among the total production of our marine catch, gill net and hooks and lines (long lines) fishing contributes 59.58% and 2.21% respectively, on which tuna exploitation by long lines contributes less than 0.5% and in gill nets fishing less than 1.0% in artisanal fishing. And in industrial production, tuna fish contributed only 2.22 % (DoF, 2012-2013). From the export statistics showed that about 22 tons of tuna (mostly eastern little tuna) were exported to Thailand in the year 2003 as block frozen (BSB, 2003).

Materials and Methods

The field study about tuna fish species was conducted from July, 2012 to June, 2013 in fish landing centers namely BFDC Fish Harbor at Cox's Bazaar. In artisanal fishing, there are also gill nets & hooks and lines (Long lines) fishery operating mainly South-East part of the Bay of Bengal in Cox's Bazaar base. This sampling center selected in order to cover a wide range of the most landing centers, retail and whole sale markets, Month wise total landing data were recorded at this landing station and formal face to face interview of boat owners/drivers of mechanized boats by Scientific Officers and field staff of MFSMU alternately. The data were collected in new-moon, full-moon, first quarter, last quarter and other days of the moon month from this landing centers. Samples are taken 8 days in every month of the year. In industrial harvesting, fishing data were supplied by Marine Fisheries Office, Chittagong. Statistical software Excel was used for data analysis.

Results

During July, 2012 to June, 2013 a total 2227.471 MT tuna fish were landed as by catch and incidental catch with the other marine fish, of which 1624.51 MT of small size tuna fish harvested within 16749 days by 138 number of different fish trawlers mainly mid water trawlers and the rest 602.961 MT was exploiting in artisanal fisheries by 6789 number

of mechanized boats within 178 fishing days which landed only at Cox's Bazaar BFDC fish harbor.

Abundance of species

All tuna fish are captured more or less every the month of the year, but maximum was harvested in winter & monsoon season in the South patches and Middle ground areas. During the study period, 7 species of tuna were recorded in our marine territory and these are *Auxis thazard*- Frigate tuna (Lacepede, 1800), *Auxis rochei*-Bullet tuna (Risso, 1810), *Euthynnus affinis* -Eastern little tuna / kawakawa (Cantor, 1849), *Thunnus albacares* -Yellow fin tuna (Bonnaterre, 1788), *Thunnus obesus* -Big eye tuna (Lowe, 1839), *Thunnus tonggol*-Long tail tuna (Bleeker, 1851 and *Katsuwonus pelamis* -Skipjack tuna (Linnaeus, 1758). Among them *Euthynnus affinis*, *Auxis thazard* and *Thunnus obesus* are available, which are exploits mainly by gill nets and hooks & lines in artisanal fishing; *Thunnus tonggol*, *Auxis rochei* and *Katsuwonus pelamis* are captured by different fish trawlers, mainly mid water trawl and incidental catch of *Thunnus albacares* in industrial & artisanal fishing. Frigate tuna, Eastern little tuna (Kawakawa) and Big eye tuna mainly caught in monsoon, Long tail & Skipjack tuna exploit in winter, Yellow fin tuna harvested in winter & monsoon but, Bullet tuna found in summer (Table, 1).

Total landing (Industrial fishing):

During the study period total 1624.51 MT of different small size of tuna were harvested. In the month of July, 2012 no fishing could due to rough weather. And in the month of August, 2012 total captured tuna fish was 8.379 MT followed by 126.883 MT, 61.538 MT, 160.262 MT, 222.860 MT, 222.788 MT, 262.048 MT, 306.561 MT, 221.993 MT, 6.380 MT and 24.818 MT were harvested in the month of Sep, 12, Oct, 12, Nov, 12, Dec, 12, Jan, 13, Feb, 13, Mar, 13, Apr, 13, May, 13, and Jun, 13, respectively (Table, 2 & Fig, 1).

Catch Per Unit Effort (CPUE)

During the sampling period total 138 numbers of fishing trawlers were harvested within 16749 days and total 1624.51 MT of tuna fish captured.

Table 1. Abundance of Tuna fish species during July, 2012 to June, 2013

S.L No	Name of Species	English name	Abundance (Month)	Name of gear
1	<i>Auxis thazard</i> (Lacepede,1800)	Frigate tuna	monsoon	gill net & hooks and lines
2	<i>Auxis rochei</i> (Risso,1810)	Bullet tuna	summer	fish trawl
3	<i>Euthynnus affinis</i> (Cantor,1849)	Eastern little tuna / Kawakawa	monsoon	gill net & hooks and lines
4	<i>Thunnus albacares</i> (Bonnaterre,1788)	Yellow fin tuna	winter & monsoon	hooks and lines & rarely fish trawl
5	<i>Thunnus obesus</i> (Lowe, 1839)	Big eye tuna	monsoon	gill net & hooks and lines
6	<i>Thunnus tonggol</i> (Bleeker, 1851)	Long tail tuna	winter	fish trawl
7	<i>Katsuwonus pelamis</i> (Linnaeus, 1758)	Skipjack tuna	winter	fish trawl

Table 2. Total landing of Tuna fish species in Industrial fishing

Month	No of Trawlers engaged	Active fishing days	Total fish harvesting (MT)	Total landed Tuna fish (MT)	CPUE (kg)	% Contribution
July,12	0	0	0	0	0	0
Aug,12	40	323	1817.61	8.379	25.94	0.46
Sep,12	106	964	4484.75	126.883	131.62	2.83
Oct,12	108	952	3246.83	61.538	64.64	1.90
Nov,12	121	1442	5146.75	160.262	111.14	3.11
Dec,12	137	2691	11224.50	222.860	82.82	1.99
Jan,13	132	2343	10471.10	222.788	95.09	2.13
Feb,13	133	2496	9505.68	262.048	104.99	2.76
Mar,13	138	2663	10611.50	306.561	115.12	2.89
Apr,13	131	2320	10931.17	221.993	95.69	2.03
May,13	15	147	769.22	6.380	43.40	0.83
Jun,13	72	408	1029.18	24.818	168.83	2.41
Total	138	16749	69238.29	1624. 51		

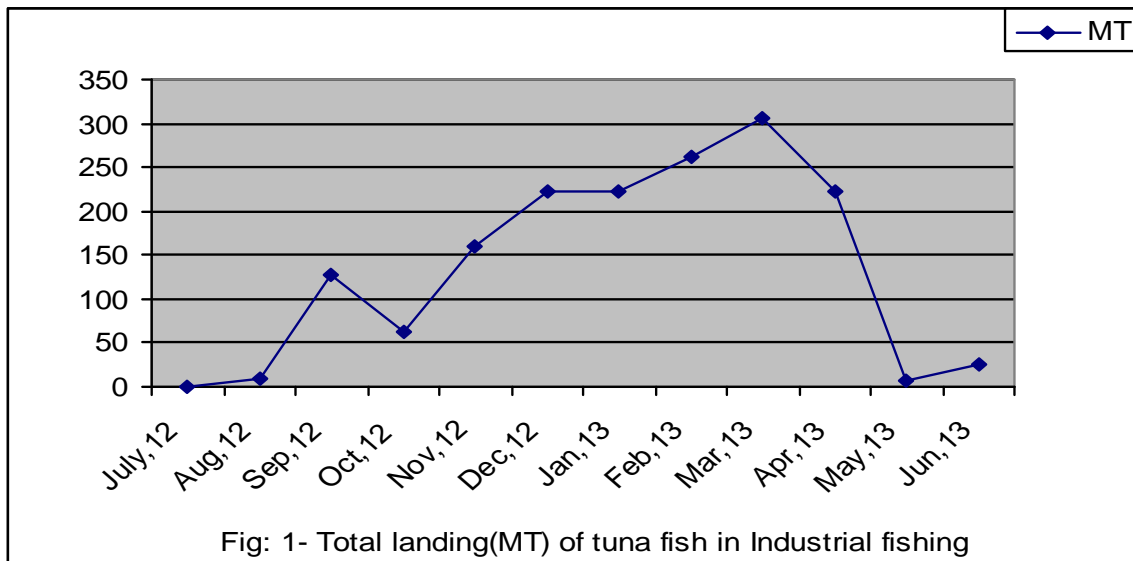


Fig: 1- Total landing(MT) of tuna fish in Industrial fishing

Average CPUE was 96.99 kg. No fish trawler was fishing in July, 2012. In the month of Aug,12, CPUE was 25.94 kg followed by 131.62 kg, 64.64 kg, 111.14 kg, 82.82 kg, 95.09 kg, 104.99 kg, 115.12 kg, 95.69 kg, 43.40 kg and 168.83 kg were in the month of Sep,12, Oct,12, Nov,12, Dec,12, Jan,13, Feb,13, Mar,13, Apr,13, May,13, and Jun,13 respectively (Table,2 & Fig, 2).

Percentage contribution

During the study period total landing volume of different commercial fishes were 69238.29 MT. Among them, only 1624.51 MT of tuna fish was captured, which contributes only 2.35% of the total fish landing. Percentage contribution in the month of Aug,12 was 0.46% followed by 2.83%, 1.90%, 3.11%, 1.99%, 2.13%, 2.76%, 2.89%, 2.03%, 0.83% and 2.41% were in Sep,12, Oct,12, Nov,12, Dec,12, Jan,13, Feb,13, Mar,13, Apr,13, May,13, and Jun,13, respectively (Table,2).

Total landing (artisanal fishing)

In artisanal fishing, total landing volume of different tuna fish was 602.961 MT during July, 2012 to June, 2013 in BFDC fish harbor, Cox's Bazaar. In the month of July,12 total exploiting of tuna fish was 50.000MT followed by 11.570 MT, 72.260 MT, 106.842 MT,114.305 MT, 42.783 MT, 66.075 MT, 45.225 MT, 59.080 MT, 27.621MT, 3.200 MT and 4.000 MT were in Aug, 12, Sep,12,

Oct,12, Nov,12, Dec,12, Jan,13, Feb,13, Mar,13, Apr,13, May,13 and Jun,13 respectively (Table,3 & Fig, 3).

Catch Per Unit Effort (CPUE)

During the study period total 6789 number of mechanized boat were engaged in gill nets and hooks & lines fishing within 178 days at BFDC fish harbor for capture the tuna fishes. Average active fishing days per boat per month was 15 and average CPUE was 88.81kg. In the month of July, 12, CPUE was 74.07 kg. followed by 27.55 kg, 91.82 kg, 73.23 kg, 203.39 kg, 75.06 kg, 144.58 kg, 105.91kg, 154.66 kg, 61.38 kg, 14.22 kg and 10.67 kg were in the month of Aug,12, Sep,12, Oct,12, Nov,12, Dec,12, Jan,13, Feb,13, Mar,13, Apr,13, May,13 and Jun,13 were respectively (Table, 3 & Fig, 4).

Percentage contribution

During the sampling period total 7344.730 MT of different fish were landed; among these landing volume, 602.961 MT was tuna fish, which contributed only 8.21% in the total fish landing at BFDC fish harbor. In the month of July,12 total percentage contribution was 8.88 followed by 2.75%, 9.47%, 4.91%,11.24%, 7.52%, 15.12%, 13.90%, 16.23%, 6.21%,3.57% and 2.26% were in

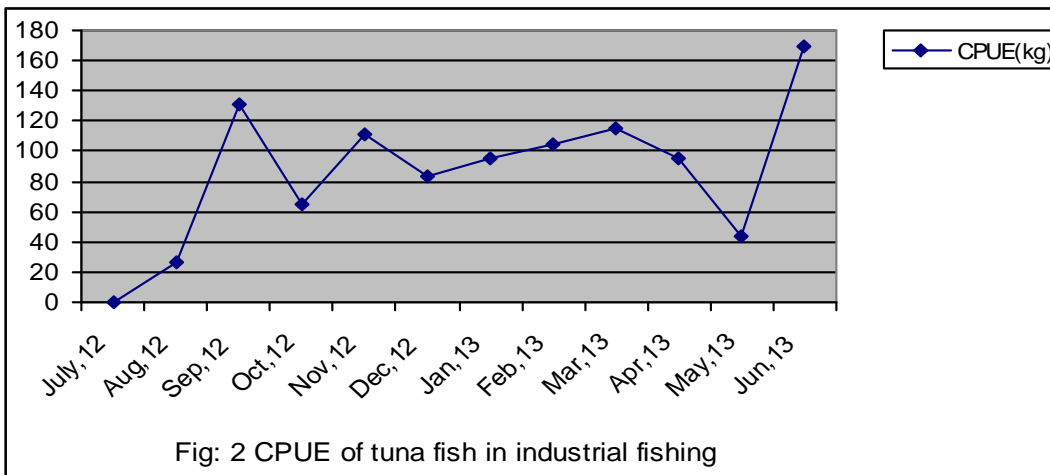
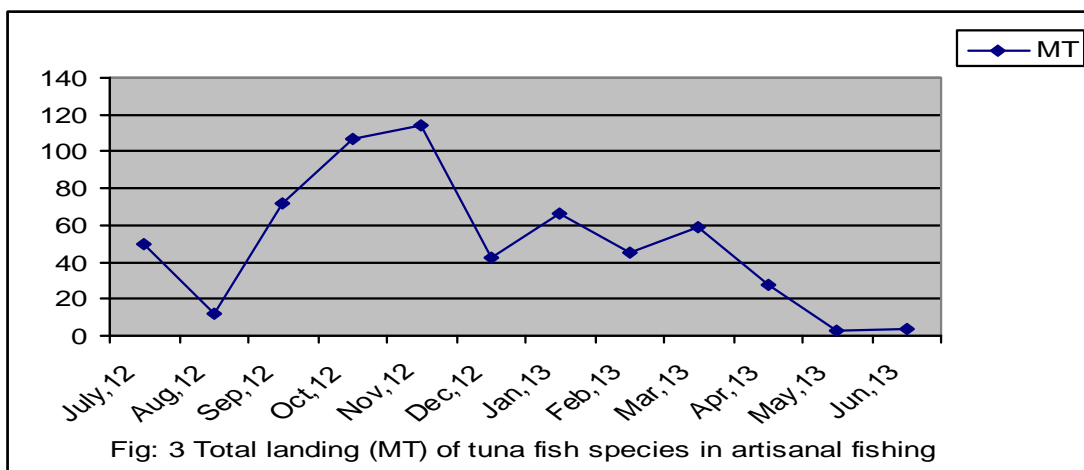
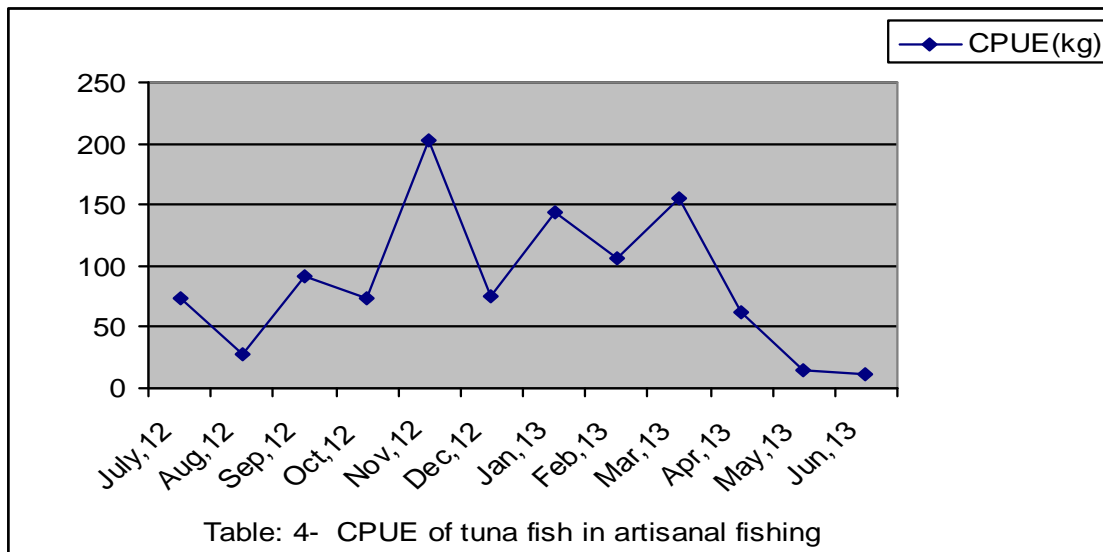


Table 3. Total landing of Tuna fish species in Artisanal fishing

Month	Total no. of boats landed	Active fishing days	Total landed fish(MT)	Total landed Tuna fish (MT)	CPUE(KG)	% Contribution	Remarks
July,12	675	12	562.950	50.00	74.07	8.88	6000-7000 numbers of mechanized boats are engaged in artisanal fishing
Aug,12	420	10	420.842	11.570	27.55	2.75	
Sep,12	787	12	763.390	72.260	91.82	9.47	
Oct,12	1459	13	2174.910	106.842	73.23	4.91	
Nov,12	562	25	1016.658	114.305	203.39	11.24	
Dec,12	570	22	568.860	42.783	75.06	7.52	
Jan,13	457	22	436.890	66.075	144.58	15.12	
Feb,13	427	20	325.370	45.225	105.91	13.90	
Mar,13	382	20	364.050	59.080	154.66	16.23	
Apr,13	450	8	445.050	27.621	61.38	6.21	
May,13	225	6	89.760	3.200	14.22	3.57	
Jun,13	375	8	177.000	4.000	10.67	2.26	
Total	6789	178	7344.730	602.961			





Aug,12, Sep,12, Oct,12, Nov,12, Dec,12, Jan,13, Feb,13, Mar,13, Apr,13, May,13 and Jun,13 were respectively(Table,3).

Discussion

During the study from July, 2012 to June, 2013 total landing volume of 7 species of tuna fishes was 2227.47 MT. Among these landing, industrial and artisanal fishing contributes 72.93% and 27.07% respectively. In industrial fishing sector average CPUE was 96.99 kg, which harvested by different fish trawlers mainly Mid-water trawl and in artisanal fishing sector average CPUE was 88.80 kg by gill nets and long lines fisheries.

In the month wise trawl fishing, total landing were gradually increase from October, 2012 to March, 2013; highest landing recorded in the month of March, 2013. And in artisanal fishing total landing were gradually raised from August, 2012 to November, 2012.

These species appear only as incidental catches of the drift gill netters. There are about 6000–7000 boats operating with drift gill nets. The quantity of tuna as by catch of gill netters is only 0.62% (Huq, 1993) of the total landing in Cox's Bazar landing centre. Due to the modern fishing activities,

increasing the active fishing days and number of gears are responsible to increased the captured of tuna fishes, which contributed 8.21% of the total fish landing as record at BFDC fish harbor. And this is not same to the Huq, 1993 report, but number of engaged boats are same in our findings.

India's contribution to total Oceanic tuna and associated species catch from the Indian Ocean during 2006 was 2.01%. Our Oceanic tuna catches are far below the potential estimated (Anon, 2011). The tuna resources presently exploited in India are comprised of the small tunas, such as *Euthynnus affinis*, *Auxis thazard*, *A. rochi* and *Thunnus tonggol* in the coastal sector and *Katsuwonus pelamis*, *Thunnus albacares* and *T. obesus* in the Oceanic waters (Pillai, 1995).

Ten species of coastal/neritic and oceanic species are encountered in the fishery. Neritic tunas are represented by little tuna (*Euthynnus affinis*), frigate tuna (*Auxis thazard*), bullet tunas (*Auxis rochi*), long tail tuna (*Thunnus tonggol*) and bonito (*Sarda orientalis*). Oceanic species are represented by yellow fin (*Thunnus albacares*), skipjack tuna (*Katsuwonus pelamis*), dogtooth tuna (*Gymnosarda unicolor*), albacore (*Thunnus alalunga*) and big eye tuna (*Thunnus obesus*) (Babu, 2013).

Coastal tunas were caught as incidental catch in many gears. Major share of the catch was realized in gillnets (45.59%) and hooks & line (17%). Other gears landing tunas are pole & line, trawls and bag nets. Considerable variation has observed in the catch composition of different gears (Babu, 2013). In our study period 7 tuna species are recorded in coastal and deep sea areas of our marine territory, which is related to the Khan, 1992 and Pillai, 1995 report. According to the Babu, 2013 report 10 tuna species are record which are not same but, in another report of Babu, 2013, main fishing gears for captured tuna fish are gillnets and hooks & line and others which related our study report.

Annual average landing in Bangladesh during (1965-1970) Tuna and tuna- like fishes catch were 1-6 thousand of Metric tons, which contributes only 3.4 percent of total catch (FAO,1970). But in our study period total landing were 2227.47 MT and average percentage contribution of tuna fish was finding only 2.35%, which are related to the Pillai, 1995, FAO, 1970 and Anon, 2011 report.

Observation from the surveys of R.V. Fishery Research No.2 (1979) showed that Spanish mackerel (*S. commerson*), frigate tuna (*A. thazard*) and long tail tuna (*Thunnus tonggol*) appears to be relatively more abundant than other species. These occur more in the 28 – 31m, depth area (Lat. N 21° – 15-00, Long E 20°-22-00).

Neritic small tuna species including long tail tuna (*Thunnus tonggol*), kawakawa (*Euthynnus affinis*) and frigate tuna (*Auxis thazard*) have traditionally been caught in Malaysia at subsistence levels by fishermen using several of fishing gears. Similar to Malaysia, the Philippines, Indonesia and Thailand use purse seine, long line and vertical hand lines to catch tunas; the same oceanic and neritic tuna species are also taken (Chee, 1995). In our sampling period, recorded tuna species and reports of Chee,1995 & R,V, Fishery Research No-2(1979) about neritic tuna species are same in listed but, fishing method for captured are not similar.

Size range of the fish in the catch of India's tuna fishing was *E. affinis* 24-60cm, with the mode

supporting the fishery in the 38-64 cm size range; *A. thazard* 22-54 cm, with modes in the 32-42 cm size groups; *K. pelamis* 24-68 cm, with modes in the 42-64 cm size groups; *T. albacares* 28-90 cm, with modes in the 42-86 cm size groups; *S. orientalis* 36-54 cm, with modes in the 43-48 cm size group and *A. rochei* 22-34 cm, with modes in the 24-28 cm size group (Somvanshi, 1998).

During the study period, the abundance and landing in BFDC fish harbor at Cox's Bazar, indicate the presence of small coastal tuna fish, such as frigate tuna (*Auxis thazard*, average size was 30cm) and eastern little tuna (*Euthynnus affinis*, average size 45 cm) in artisanal fishing. Offshore and oceanic surface landed tuna species were skipjack (*Katsuwonus pelamis*, average size 50cm) and bullet tuna (*Auxis rochei*, average size 26 cm) in different trawl fishing also. Small size of *Euthynnus affinis*, *Auxis thazard* and *Thunnus obesus* were exploited as by catch in gill nets and hooks & lines and incidentally *Thunnus albacares* in coastal waters and in deep sea fishing maximum number of *Katsuwonus pelamis*, *Thunnus tonggol* and *Auxis rochei* were harvested mainly in winter & summer season at the South patches and Middle ground areas; some times also captured *Thunnus albacares*, which are related to the Somvanshi, 1998 report.

In Philippines six tuna species are: *Auxis thazard* (Frigate tuna), *Auxis rochei* (Bullet tuna), *Euthynnus affinis* (Eastern little tuna / kawakawa), *Katsuwonus pelamis* (Skipjack tuna) *Thunnus albacares* (Yellow fin tuna), *Thunnus obesus* (Big eye tuna) (DST, 1998). In this study period, 7 tuna species were captured, but in Philippine's 6 tuna species were recorded; except long tail tuna, all species are harvested in the Bay of Bengal of Bangladesh region which are same to the DST, 1998 report.

The Indian tuna fishery comprises two distinct segments, the coastal fishery and Oceanic fishery. From 1996 and in 1998 five foreign tuna long liners are in operation under these schemes. The declared catch of these vessels in the current year a CPUE of 2.0 tons, consisting of yellow fin tuna (55.5%), big eye tuna (1%), skipjack (1.9%) swordfish (18.1%),

marlin (15%) sailfish (3.9%) and sharks (4.6%) % (Somvanshi, 1998). In our study period could not possible species wise CPUE analyzing average CPUE were 96.99 kg and 88.81kg in industrial and artisanal fishing respectively, which are related to the Somvanshi, 1998 report.

There seems little doubt that pelagic fish form a large and virtually untapped resource in the Bay of Bengal (West, 1973). Available catch statistics indicate that, at present, pelagic fish contribute only about one-fifth of the total landings of marine fish in Bangladesh. According to our study report, for the availability of tuna fish in the Bay of Bengal and international market demand, which are related to the Dr. Fridtjof Nansen survey (Saetre, 1981) and West, 1973 report.

There are 6 species of neritic tuna and sheer fish under IOTC management i.e. long tail tuna (*Thunus tonggol*), frigate tuna (*Auxis thazard*), bullet tuna (*Auxis rochei*), kawakawa (*Euthynnus affinis*), narrow-barred Spanish mackerel (*Scomberomorus commerson*) and Indo-Pacific mackerel (*Scomberomorus guttatus*) (Herrera, 2009). National Fisheries Statistic of Indonesia (Anonymous, 2006 and 2010) noted those the six species were caught in western Sumatra and Java Indian Ocean. The six species generally are part of the catch of purse seine, drifting gillnet, hand lining and trolling gear.

The fishing ground for yellow fin tuna extends between latitudes 10° N-15° S seasonal fluctuations in catches occur off Australia, Madagascar and Bay of Bengal (IPTP, 1988).. In the Japan 1960-1970 and 1980'S only four species of tuna was available and they are: Yellow fin tuna, big eye tuna, Albacore, Southern Blue fin tuna. In Korea, these three tuna species recorded and they are- Yellow fin tuna, big eye tuna, Albacore. In China (Taiwan) these three tuna species are available- Yellow fin tuna, big eye tuna, Albacore (IPTP, 1988). But in our study 7 tuna species are recorded, which are some related to the Herrera, 2009, Anonymous, 2006 and 2010) and IPTP, 1988 report.

Conclusion

As the quantity of tuna and tuna like fishes caught by different fisheries are very small, tuna and tuna like fishes are grouped together with other fishes as miscellaneous fishes in compiling statistical data. So there is no exact data on the amount of tuna and tuna like fishes landed in Bangladesh. For proper management of tuna fisheries need data collection about of their size, weight, harvesting times, abundance location and their biological data. It seems that, the presences of tuna fish species in our marine territory are available, but seasonal.

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References

- Anonymous, 2006. Compilation of information on neritic tuna species in the Indian Ocean. a working paper, IOTC-2006-SC-INF11.
- Anonymous, 2010, Summary of National Fisheries Statistic of Indonesia Year 2001-2009. DGCF, Ministry Marine Affairs and Fisheries of Republic Indonesia.
- Anon, 2011. Report of the working group for revalidating the potential of fishery resources in the Indian EEZ. Report to the Dept. of the Animal Husbandry Dairying and Fisheries, Ministry of Agriculture. Government of India. Pp69.
- BBS, 2003, Bangladesh Bureau of Statistics (BBS), E-27/A, Agargaon, Sher-e-Bangla Nagar, Dhaka-1207, Bangladesh
- Bhatia, U, Nuchmorn, P and Boonragsa, V, 1989. Review of Tuna fishery and industry of Thailand, Indo-Pacific. Tuna Dev. Mgt. Programme IPTP/89/Gen/17: 50-56.
- Babu, C and Anrose, A, 2013. Status of Neritic Fisheries in India. Fishery Survey of India,

- Chennai. Third Working party on Neritic Tunas, Bali, Indonesia, 2-5 July,2013. IOTC-2013-WPNT03-09.
- Collette, B.B. and Nauen, C.E. 1983. FAO species Catalogue, Vol.2. Scombroides of the world. Annotated and Illustrated catalogue of Tunas, mackerels, bonitos and related species known to date. Fish. Synop: (125), Vol.2137p.
- Chee, P.E, 1995. Tuna fisheries interaction in Malaysia. Fisheries Research Institute. Department of Fisheries in Malaysia. 1170 Gelugor, Penang, Malaysia.
- Chang, S.K and H.C.LIU, 1995. Adjusted Indian Ocean CPUE series of Taiwanese long line and drift net fisheries OPTP collective volume- 9(3): 264-266
- DST, 1998. Philippine Commercial Tuna Species of Philippines. Council for Aquatic and Marine Research and Development, Department of Science and Technology, Laguna, Philippines).
- DoF, 2012-13, Fisheries Statistical Year Book f Bangladesh. Department of Fisheries, Matshya Bhaban, Dhaka
- FAO, 1997. Review of the status of the world fishery resources: marine fisheries. FAO Fisheries Circular No. 920 FIRM/C920, Rome.
- FAO, 1970, Biological consideration in the development of marine fisheries in the Bay of Bengal near the coast of East Pakistan. Based on the work of D.A. Shubnikov, Rome, 1970. /1972, Rep. FI: DP/PAK/65/522/2:58p.
14. Huq, Q.M, Khan, M.G, Chowdhury, Z.A. and Sarker, M.N.1993.The Bottom long line Fishery for Croaker (Sciaenidae). In; Studies of interactive marine fisheries of Bangladesh. BOBP/WP/89.107-114pp.
- Herrera, M& Lucia Pierre, 2009. Status of IOTC Data bases For Neritic Tunas. IOTC_2009-WPDCS-06
- ITPT, 1988, Atlas of Industrial Tuna Long line and pursing fisheries in the Indian Ocean, April, 1988. Indo-Pacific Tuna Development and Management Programme (IPTP), Colombo, Sri Lanka. (IPTP) FAO, UNDP.
- IOTC,2013. Regional Workshop to Support the Implementation of the Resolutions of the Indian Ocean Tuna Commission. Indian Ocean Tuna Commission. Implementation of IOTC Conservation and Management Measures. Under sting IOTC and the International Fisheries Management frame work. Work shop held on 11-14 February,2014 in Kuala Lumpur, Malaysia.
- Khan, M.G. 1992. Bangladesh sustainable Development of Marine Fishery Resources and Assessment Requirement of Trained Manpower. Paper presented at the first Asia-Pacific Seminar on sustainable Ocean Dev. and Mangt. July, 27-30, 1992, AIT, Bangkok, Thailand.
- Khan, M.G. and M.A. Latif.1995. Potentials Constraints and Strategies for conservation and management of open brackish water and marine fishery resources. Paper presented at the National Seminar on Fisheries Resources, Development and management organized by MOFL, Bangladesh with FAO and ODA. 29-October to 31 November,1995, Dhaka, Bangladesh,19p.
- Lamboeuf, M. 1987. Bangladesh Demersal Fish Resources of the continental shelf, R/V. Ansandhani Survey results, September, 1984-June, 1986. Food Agriculture Organization of the United Nations, Rome.
- Pillai, N.G.K, Pillai, P.P and Said Koya, K.P, 1995. Status report on the tuna fishery in India, with particular referace to long tail tuna, *Thunnus tonggol*. Central Marine Fisheries Research Institute, Cochin, India
- Rahman, A.K.A.1993. Marine Small Scale Fisheries of Bangladesh. Regional office for Asia and the Pacific (RAFA), Bangkok, 55p
- Saetre, R.1981. Surveys of the Marine Fish Resources of Bangladesh. Nov. Dec. 1979 and May, 1980 Reports on Surveys with the R/V Dr. Fridtjof Nansen, Institute of Marine Research , Bergen,67p.
- Somvanshi, V.S, Pallai, N.G.K and John, M.E, 1998. Current Status of Fisheries for Tunas and Tuna-like fishes in India. Expert Consultation on Indian Ocean Tunas, Victiria. Seychelles, 9-14 November, 1998.
- SPC, 2010. Annual Report of the SPC / Secretariat of the Pacific Community(SPC) 2010–2012, Strategic Plan, available on line: <http://www.hppt//aid.dfat.gov.au/.../pacific/.../secr...>

West, W.Q.B.1973. Indian Ocean Programme. Indian Ocean Fishery Commission, Fishery Resources of the upper Bay of Bengal UNDP, FAO, Rome, December,197317. Khan, M.G. 1992. Bangladesh sustainable Development of Marine Fishery Resources and Assessment Requirement of Trained Manpower. Paper presented at the first Asia.