

Update on the neritic tuna fisheries of Pakistan with special reference to frigate tuna (*Auxis thazard thazard*)

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ABSTRACT

Neritic species contributes substantially to the tuna landings in Pakistan. These species are caught with surface gillnets which are mainly operated in the continental shelf area of Pakistan. Three species i.e. longtail tuna (*Thunnus tonggol*), kawakawa (*Euthynnus affinis*) and frigate tuna (*Auxis thazard thazard*) dominate in the commercial catches. The studies based on analysis of landings data and those collected by on-board observers indicate that neritic tuna species have bimodal seasonal abundance pattern with a major peak in September-October and a minor peak in April-May. A comparison of species composition observed in previous studies was made which reveals a marked difference in species composition in neritic tuna which is primarily dependant on the area of operation of the gillnet vessels.

INTRODUCTION

Tuna gillnetting is an important fisheries of Pakistan which is based both on neritic and oceanic tuna species. Recent studies revealed that that contribution of neritic tuna (longtail tuna, kawakawa, frigate and bullet tunas) and oceanic tuna (yellowfin and skipjack) is almost equal (Nawaz and Moazzam, 2014). There has been a change in the contribution of neritic tuna depending upon area of operation of tuna gillnetters along the Pakistan coast (Moazzam, 2012a). previous studies have revealed that those vessels which were operating in comparatively inshore water, neritic tuna contributed about 54% whereas those operating in comparatively deeper waters, the contribution of neritic tuna was only about 4 %. Contribution of neritic tuna in total tuna landings changed substantially during 2009 and 2011 when most of the tuna gillnet vessels started operation in water closed to coast because of increasing Somali piracy. Analysis of landings during 2011 revealed that neritic tuna contributing about 86 % in vessels operating from Karachi whereas those operating from Balochistan used to have about 94 % neritic tuna (Moazzam, 2012b). The situation has changed now and tuna gillnet vessels are now operating in comparatively deeper waters along the coastline which has also altered the composition of tuna species in the catches.

Present paper describes the status of neritic tuna fisheries of Pakistan encompassing species composition and historical changes in catch composition. The paper is also focused on the frigate tuna (*Auxis thazard thazard*) describing its importance in neritic tuna as well as its marketing and some aspects of its fishery.

MATERIALS AND METHOD

A daily monitoring programme of tuna fishing vessel (gillnetters) was initiated in July 2012 at Karachi Fish Harbour which is main landing centre for tuna landings. With the exception of Sundays, data was collected from this harbour on daily basis. Fishermen were interviewed to provide information pertaining to fishing operation and other related aspect. An observer programme was initiated by WWF-Pakistan whereby trained observers were posted on 4 tuna gillnetters operating from Karachi Fish harbour. A comparison of data recorded from commercial landing at Karachi Fish Harbour with the information collected by the observers. While comparing the two set of data it was kept in mind that a few tuna gillnet vessels tranship their catch to vessels from neighbouring country as well as retain a part of the catch for later auction.

RESULTS

The data collected from monitoring of commercial landings at Karachi Fish Harbour indicated that the neritic tuna contribute about 50 % in the total tuna landings whereas remaining 50 % was contributed by oceanic tuna species. . The data further revealed that longtail is the dominating species followed by kawakawa contributing 49 and 37% respectively (Fig.1). Frigate tuna contributed 13 % whereas bullet tuna contribution is mere 1 %. The data collected by the observers indicated that among neritic tuna kawakawa is the dominating species representing about 48 % whereas longtail contributed about 40 % (Fig. 2). Contribution of frigate tuna was about 12 % whereas bullet tuna's contribution was less than 1 %.

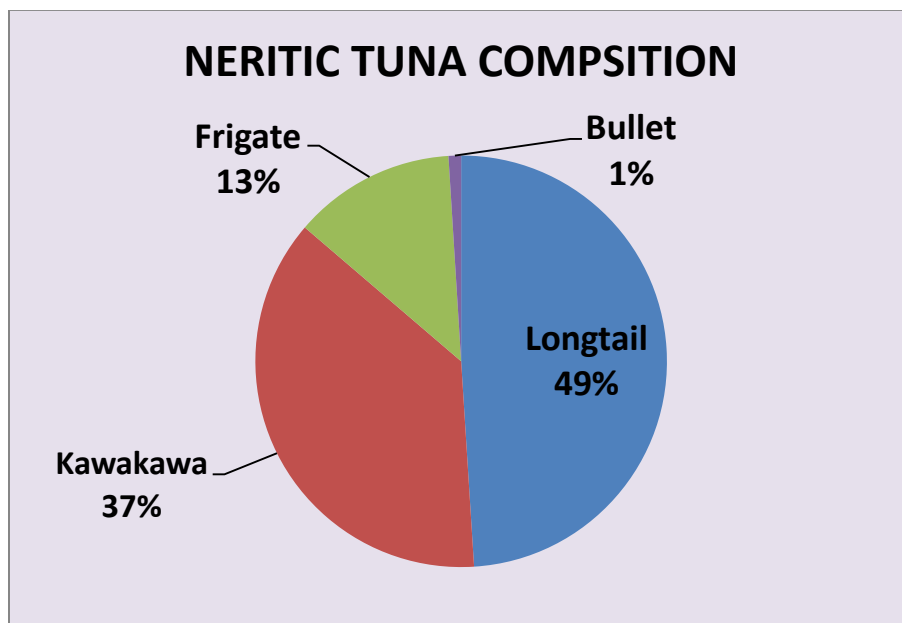


Fig.1. Pie diagram showing neritic tuna species composition from commercial landings at Karachi Fish Harbour.

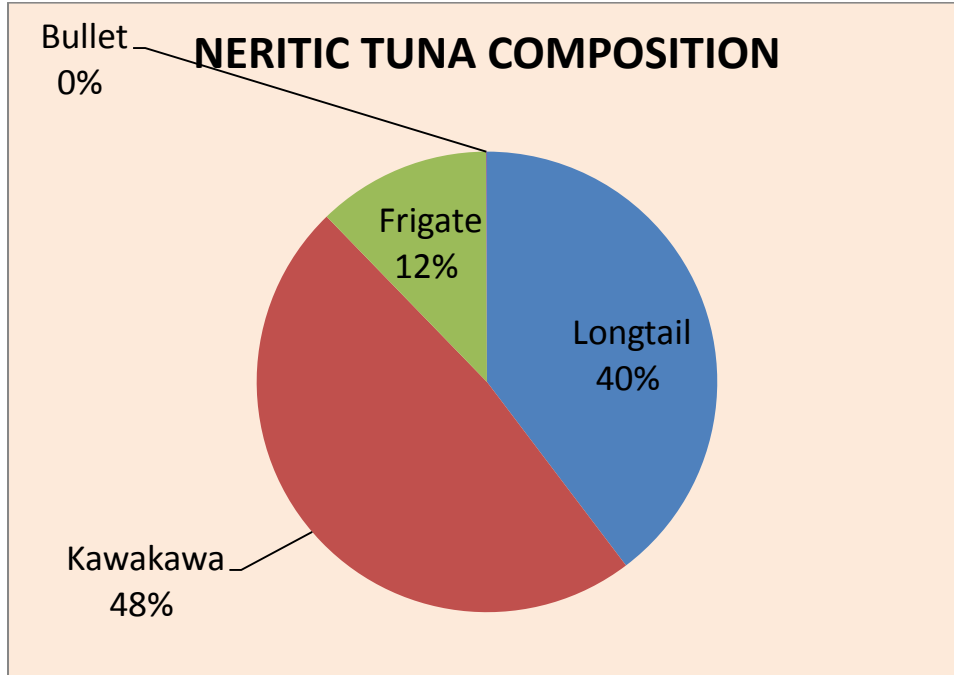


Fig.2. Pie diagram showing tuna species composition as recorded by observers

Seasonal Variation in the Species Composition of Neritic Tuna

Marked seasonal variation in species composition of neritic tuna was noticed (Fig. 3-4). In addition, these species were observed to have a bimodal distribution with a peak of landings in March and April and other and September-November. Data collected from Karachi Fish Harbour revealed that longtail tuna (*Thunnus tonggol*) has a major peak in May whereas a slightly lower peak was observed during September (Fig. 3). Kawakawa (*Euthynnus affinis*) has a major peak of landings in October whereas a minor peak was noticeable in May. Frigate tuna (*Auxis thazard thazard*) has higher landings during March and May with peak in April whereas slight increase in catches during September and November. Because of poor landings, seasonal peaks could not be identified in case of bullet tuna (*Auxis rochei*).

Data collected by observers posted on tuna gillnetters also reveals almost similar seasonal distribution pattern as observed from the commercial landings data of Karachi Fish Harbour (Fig.4). Kawakawa was observed to dominating species has a peak in October whereas minor peak was observed to be in May instead of April. Longtail has peaks in May and September as observed in landing data as well. In case of frigate tuna, three peak periods of increase landings were noticed. There was a noticeable increase of catches during February and April whereas two minor peaks of abundance was noticeable in September and November. Because of poor catches of bullet tuna, their seasonality could not be determined.

Slight disparity in seasonality of neritic tuna based on data collected from Karachi Fish Harbour, then those based on data collected by the observers can be attributed to a number of factors. Various types and sizes of tuna gillnet vessels lands their catches at Karachi Fish Harbour including those which are engaged in gillnetting for demersal species. Sometimes these vessels also catch neritic tuna species. Additionally some vessels tranship their catch to vessels from neighboring country.

It is noticeable that large tuna gillnetters stop their operation during mid May to Mid August because of traditional closure of fishing, therefore, there is no data collected by observers during this period. However, some smaller vessels continue to operate during this period, therefore, there some landings of tuna is reported from Karachi Fish Harbour.

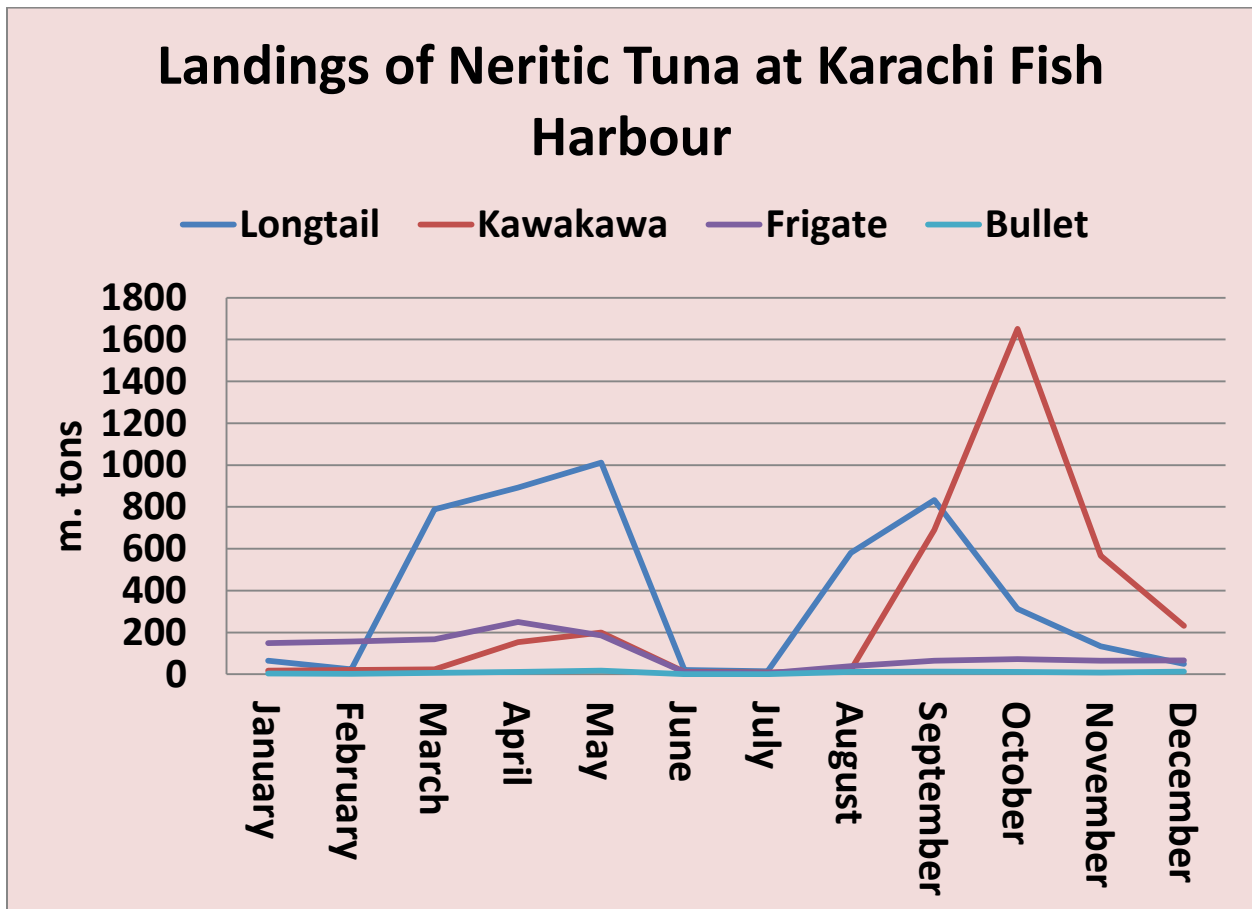


Fig.3. Monthly landings of neritic tuna species based on data collected from Karachi Fish Harbour

Frigate tuna fisheries

Frigate tuna (*Auxis thazard thazard*) is an important neritic tuna species and amongst the smallest tuna species. It is primarily found on the continental shelf area along the coastline. Almost all large tunas including yellowfin, longtail and skipjack are transported to neighbouring country whereas smaller tuna species consisting mainly of kawakawa, frigate and bullet tuna are

processed locally into dried fish and exported to Sri Lanka. Along Balochistan coast, this species is caught mainly by pelagic and demersal gillnetters operating in shallow coastal waters Sindh coast, it is caught by tuna gillnetters operating in the continental shelf area.

It is also interesting that this is the only finfish species which is partially discarded especially specimens smaller than 30 cm (total length) are not retained. Since most fishing trips last for more than 30 days, and because of small size and soft tissues, this fish when kept with ice usually get mutilated after longer period of storage. Such disfigured specimens are difficult to be sold in local market. In large tuna gillnetters only large specimens (>30 cm, TL) are retained and that too during the last part of fishing trips.

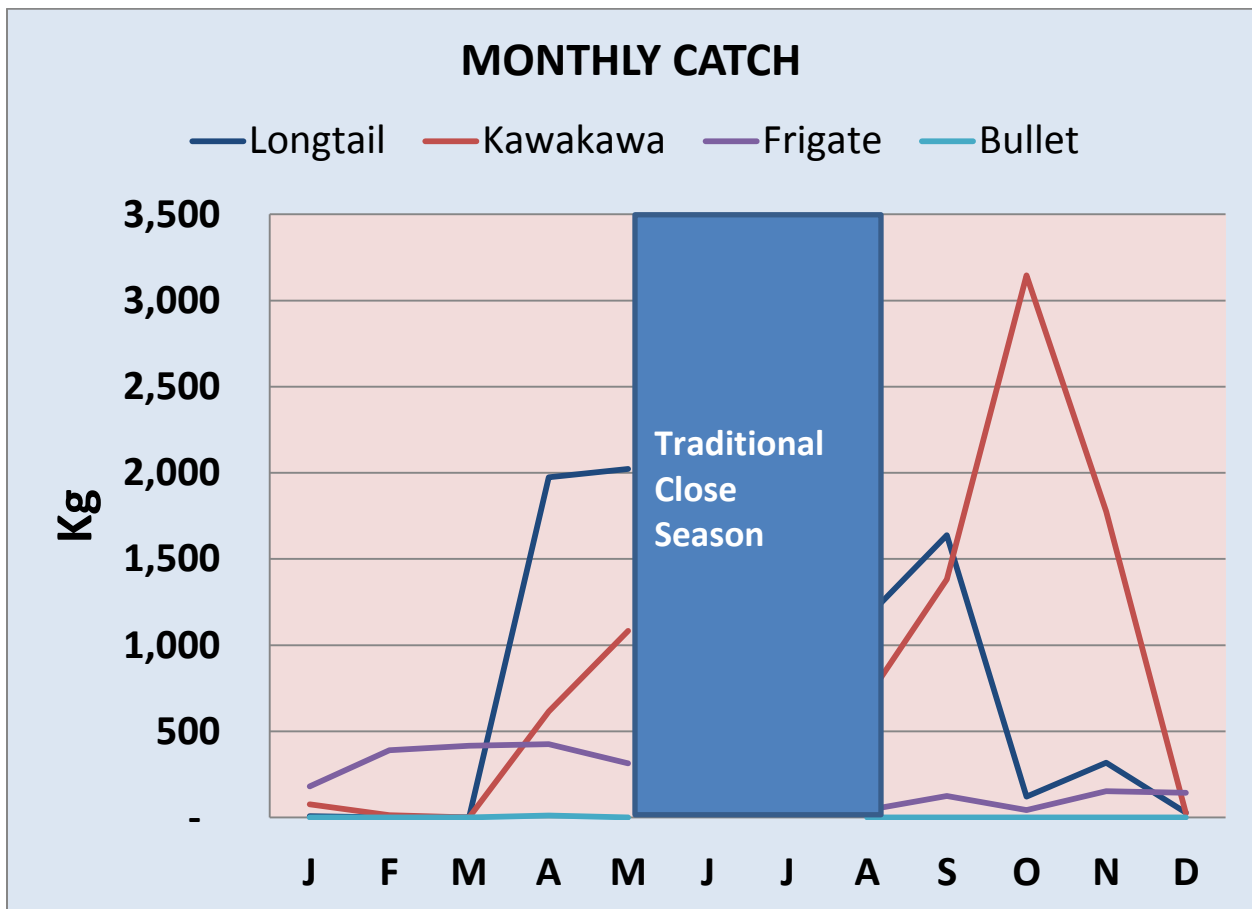


Fig.4. Monthly catches of neritic tuna species as recorded by observers

Based on the data collected by observers that on average about 30 % of the larger specimens (>30 cm) are retained and kept with ice whereas all specimens of smaller sizes are discarded. Total discard of frigate tuna is estimated to be about 70 % because of domination of specimens of smaller than 30 cm. Data of length frequency of frigate tuna is collected by the observers is being analysed. The result will be presented in next meeting of Working Party on neritic Tuna.

DISCUSSIONS

Variation was noticeable in composition of neritic tuna during the past 10 years which is mainly on account on changes in the fishing areas In the offshore water contribution of neritic tuna was bare minimum (5 %) whereas in the coastal areas sometimes neritic tuna contributed more than 90 %. Somali piracy was the main driver of the fishing pattern and area of operation during last decade. Because of a major increase in this factor between 2005 and 2012, tuna gillnetters were forced to restrict their operation to the coastal areas of Pakistan, therefore, contribution of neritic species was observed to have increased. Previously a few tuna gillnetters from Pakistan were hijacked by Somali pirates which were used as mother vessels for attacking other ships. By 2010-11, the area of operation of Somali pirates increased to Pakistan waters which compelled the fishermen to restrict fishing in shallow coastal waters, however, recent decrease in piracy has a positive impact on the tuna fisheries of Pakistan and now a number of vessels have started operating in comparatively deeper offshore waters along Pakistan coast which is evident from change in the species composition (Table-I)..

Table-I. Species Composition of Neritic Tuna along Pakistan Coast

YEAR	NERITIC TUNA SPECIES				REFERENCES
	LONGTAIL	KAWAKAWA	FRIGATE	BULLET	
Inshore (2003-2005)	33	19	2	0	Moazzam (2012a-b)
Offshore (2003-2005)	1	1	3	0	Moazzam (2012a-b)
Karachi Fish Harbour 2011	59	29	8	0	Moazzam (2012a-b)
Balochistan 2011	14	74	6	0	Moazzam (2012a-b)
Gwader 2011	18	70	11	0	Moazzam (2012a-b)
Pasni 2011	12	77	4	0	Moazzam (2012a-b)
Sur 2011	29	45	26	0	Moazzam (2012a-b)
Karachi Fish Harbour	40	48	12	>1	Present Study
Observer Programme	49	37	13	1	Present Study

Because of comparatively higher prices, longtail tuna is transported to the neighbouring country whereas kawakawa and frigate tuna are processed locally into salted dried products for Sri Lankan market. Since Pakistani tuna gillnetters undertake longer fishing trips, therefore, keeping smaller tuna especially frigate tuna with ice for longer duration is not possible, therefore, all small frigate tuna are discarded and thrown overboard.

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