Neritic Tuna Catch, Species composition and monthly average landings in Sri Lankan Tuna Gillnet Fishery operate within EEZ

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Abstract

Sri Lanka is one of the most important tuna fish producing island nations in the Indian Ocean. Of the tuna; neritic tuna namely *Euthynnus affinis* (kawakawa), *Auxis* rochei (bullet tuna) and *A. thazard* (frigate tuna) are only targeted seasonally by coastal fishing crafts operated in the country. However multiday tuna gillnet boat operations catch neritic tuna while they target oceanic tuna viz. yellowfin and skipjack tuna.

Today gillnet has become key fishing gear in the multiday tuna fishery within and beyond EEZ and has firmly been established as the dominant gear for made neritic tuna as a non target group. Consequently from 2014-2015 the percentage catch amounts of neritic tuna in the gill nets within EEZ were 55 and 34. Of the neritic tuna, bullet tuna averagely contributes 39% while frigate tuna 38% and Kawakawa 23%. Relatively higher the amounts of bullet tuna in the gill net catches may resulted from multiple reasons such as stock status and seasonality. Fluctuations in monthly average landings for three different species during 2014 to 2015 could be the result of reduction of gillnet fishing pressure within EEZ of Sri Lankan waters or potential decreases in the abundance of resources in the tuna fishing grounds.

Keywords: Neritic tuna, Multiday tuna gill net fishery, kawakawa, frigate tuna, bullet tuna

Objectives

- Identify the neritic tuna catch, species composition and CPUE in Sri Lankan Tuna Gillnet Fishery operate within EEZ

Introduction

The large pelagic fishery plays major role in capture fisheries of Sri Lanka which can be divided into costal and offshore/deep sea (Wijayaratne., 2001). Fishery is mainly comprised with tuna, billfish, sharks and seer fish resources (Haputhantri and Maldeniya., 2011). Among the tuna species four neritic tuna species frequently represent in Sri Lankan catches: *Auxis thazard* (frigate tuna), *Auxis rochei* (bullet tuna), *Euthynnis affinis* (kawakawa) and *Scomberomorus commerson* (narrow- barred Spanish mackerel) (Haputhantri., 2016). Contribution of other two varieties namely oriental bonito (*Sarda orientalis*) and long tail tuna (*Thunnus tonggol*) contribute in minute amount or zero to tuna production (Maldeniya et al, 1988; NARA-PELAGOS, 2017).

Major four neritic tuna species contribute considerable amount to the coastal and offshore fishery in Sri Lanka (Perera et al, 2014). Among the different fishing gears and gear combinations operated in tuna fishery, gillnet (GN), and ringnet (RN) are two major fishing gears that are significantly contributed to neritic tuna production (Perera et al, 2014). Mostly neritic tuna catches come from the multiday tuna vessels operated in continental slope and bordering areas of offshore (Haputhantri., 2016). As the gill net fishing operations plays considerable contribution to neritic tuna production, present study attempt to explore neritic tuna catch, species composition and catch per unit effort (CPUE) effort in Sri Lankan tuna multiday fishery.

Material and Methods

Data

Data for the study were collected from the large pelagic fishery database (PELAGOS) maintained by National Aquatic Resources Research and Development Agency (NARA). NARA has been

conducting systematic sampling programme to cover the all the fisheries districts to estimate catch and effort data in Sri Lankan large pelagic fishery.

Analysis

For the analysis three main neritic tuna species i.e Frigate tuna, Kawakawa and Bullet tuna data were selected as those three species represent significant amount in multiday tuna fish landings. Monthly neritic tuna species wise catch landings data were extracted from the data base to calculate monthly average landings, total catch and species wise catch distribution in large pelagic gillnet fishery. During the process of analysis number of records which contained missing records and unreliable data were omitted.

*Monthly average catch landing = [total catch landing (kg)]/ [number of boat landings per month]

Results and discussion

There are 960 (13.87%) total filtered records out of 6921 fish landings for three major neritic tuna catches in gill net fishery of multiday tuna fishing operations within EEZ during 2014 to 2015. Among the total records highest records were accounted for kawakawa (496) which represents 51.5%, followed by bullet tuna (27.5%) and frigate tuna (21%).

Frigate tuna catch of Sri Lanka in 2014 represents highest percentage (45%) of total neritic tuna catch, while bullet tuna and kawakawa represents 41% and 14% respectively. Bullet tuna became prominent in neritic tuna total catch production in 2015, which represents 57%, followed by kawakawa (23%) and frigate tuna (20%) (Table 1; Figure 1). Total neritic tuna catch in 2015 dropped by almost fifty percent of 2014 catch while all three neritic tuna catch in 2015 showed lower catch compare to 2014 (Figure 1).

Total neritic tuna catch within EEZ and gillnet total neritic tuna catch within EEZ during 2014 - 2015 follows same trend of the total neritic tuna catch in Sri Lanka (Figure 2 & 3).

Table 1. Neritic tuna catch (MT) composition in Sri Lanka from 2014 to 2015; Gillnet total catch within EEZ (GI_EEZ_tot), Gillnet total catch in Sri Lanka (GI_tot_SL), total catch within EEZ (Total_EEZ), total neritic tuna catch in Sri Lanka (Total_SL)

	2014			2015		
	Frigate Tuna (MT)	Bullet Tuna(MT)	Kawakawa (MT)	Frigate Tuna (MT)	Bullet Tuna (MT)	Kawakawa (MT)
GI_EEZ_tot	2232.1	1684.7	853.4	141.4	763.5	557.6
GI_tot_SL	2268.1	1726.4	970.4	186.9	769.0	603.1
Total_EEZ	4177.4	3327.2	1146.3	668.5	2683.5	984.3
Total_SL	4238.5	3888.8	1296.3	979.5	2722.2	1086.0

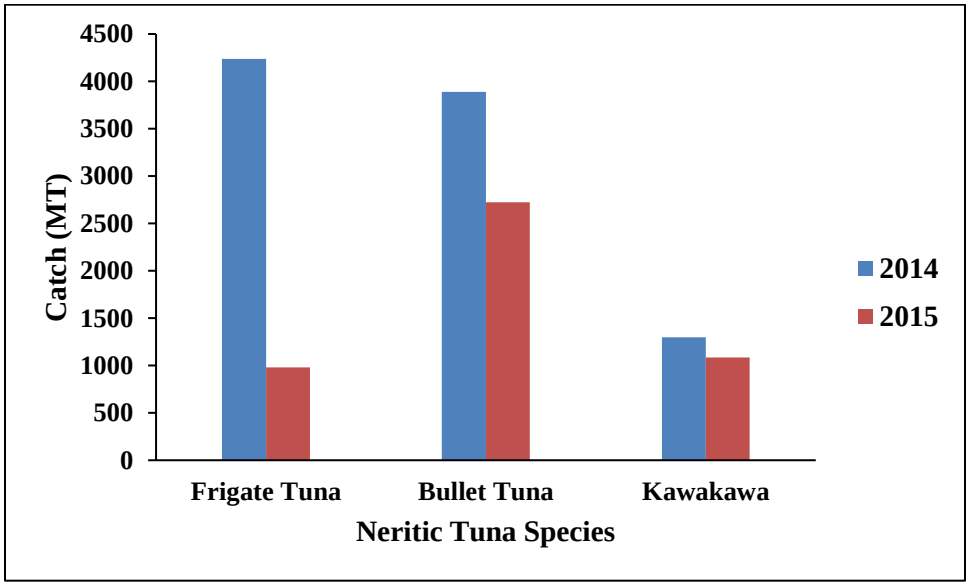

Figure 1. Total neritic tuna catch composition in multiday tuna fishery in Sri Lanka during 2014- 2015

Frigate tuna dominate with 48% in the catch composition of neritic tuna catches within EEZ in 2014 while it represents lowest contribution (15%) to the 2015. Also total catches of bullet tuna and kawakawa within EEZ shows reduction in 2015 compare with 2014 (Table 1; Figure 2).

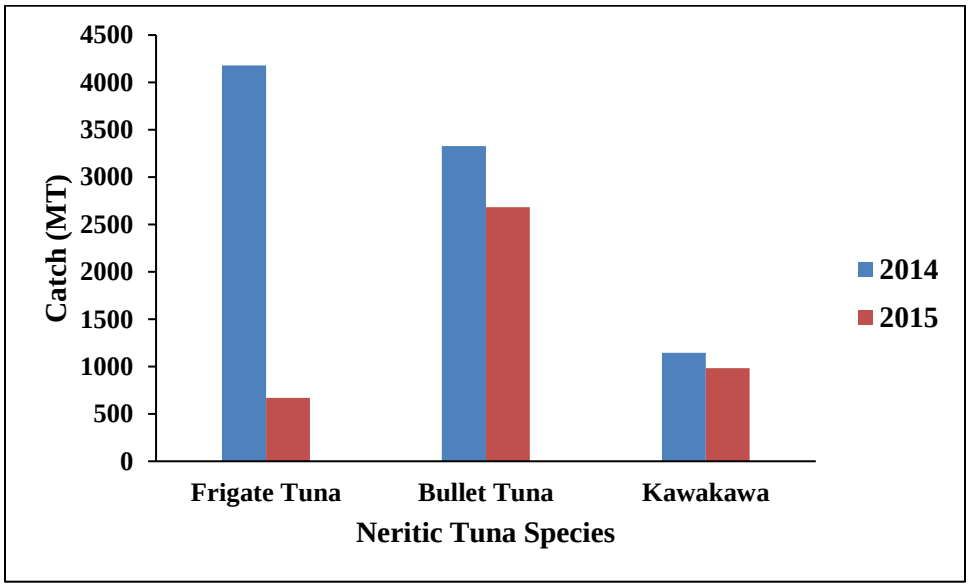

Figure 2. Total neritic tuna catch composition within EEZ in multiday tuna fishery in Sri Lanka during 2014- 2015

Neritic tuna catches of multiday tuna gillnet fishery within EEZ followed both the total neritic tuna catch composition of Sri Lanka and total neritic tuna catch composition of within EEZ in multiday tuna fishery. Frigate tuna contributed 47% to the total gillnet catches within EEZ in 2014 consequently it dropped to 10% in 2015. Contribution of bullet tuna and kawakawa to the total gillnet catches within EEZ increased in 2015 as the frigate tuna catches dropped (Figure 3). This could be mainly due to reduction of gillnet fishing activities in multiday fishing trips or due to stock status of neritic tuna within EEZ and international waters in Indian Ocean.

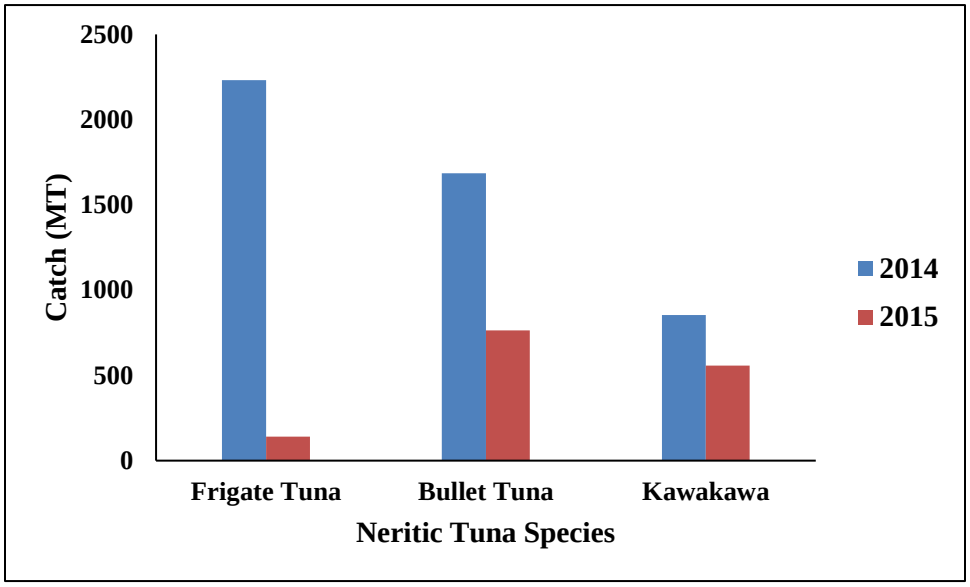

Figure 3. Total neritic tuna catch composition of gillnet within EEZ in multiday tuna fishery in Sri Lanka during 2014- 2015

Monthly average landings of frigate tuna landings varied from 4 to 300 kg/boat landings per month (±93.0) in 2014 with and 5 to 151.4 kg/boat landings per month (±43.6) in 2015. Monthly average landings of bullet tuna landings varied from 5 to 118.3 kg/boat landings per month (±31.3) in 2014 and 20.7 to 250 kg/boat landings per month (±76.9) in 2015. Kawakawa monthy average landings varied 20.2 to 107.1 kg/boat landings per month (±31.4) in 2014 and 19.6 to 57.3 kg/boat landings per month (±11.3) in 2015.

Table 2. Summary of neritic tuna monthly average catch (kg) landings of gillnet within EEZ in multiday tuna fishery in Sri Lanka 2014 to 2015

	2014			2015		
	Frigate Tuna	Bullet Tuna	Kawakawa	Frigate Tuna	Bullet Tuna	Kawakawa

Minimum	4.0	5.0	20.2	5.0	20.7	19.6
Maximum	300.0	118.3	107.1	151.4	250.0	57.3
Average	69.1	55.6	50.7	42.2	100.2	33.3
SD	93.0	31.3	31.4	43.6	76.9	11.3

Monthly average landings of neritic tuna landings highly varied with species throughout year 2014. Monthly average landings of bullet tuna landings highly varied throughout the year and were high in 2015 compared with 2014. This highly variation and high monthly average landings of bullet tuna in 2015 might be due to stock status and high seasonal abundance within the EEZ of Sri Lanka (Figure 4 & 5). It shows that monthly kawakawa average landings in 2015 quit stable throughout the year.

As the stock assessment results of kawakawa for whole Indian Ocean indicated that the stock is near the level that would produce maximum sustainable yield (MSY) (IOTC-SC19-R[E], 2016). This reduction trend of neritic tuna catch and total catch in Sri Lankan gillnet in might be due to exceeding of stock status that produce MSY in the Sri Lankan fishing zones.

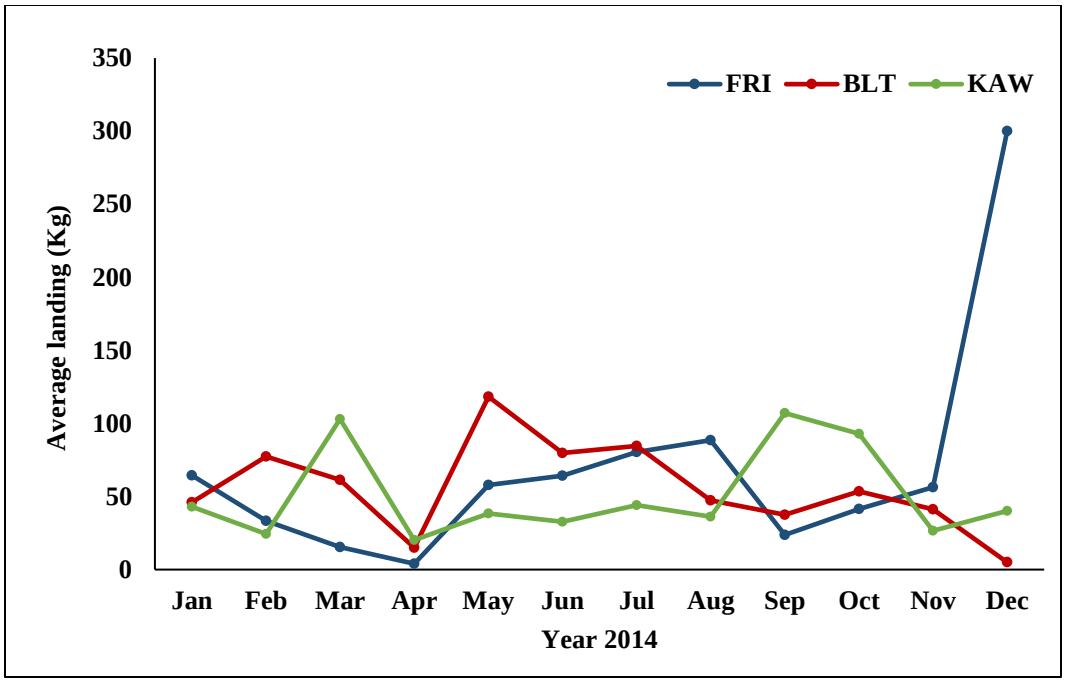

Figure 4. Neritic tuna monthly average catch landings of gillnet within EEZ in multiday tuna fishery in Sri Lanka in 2014

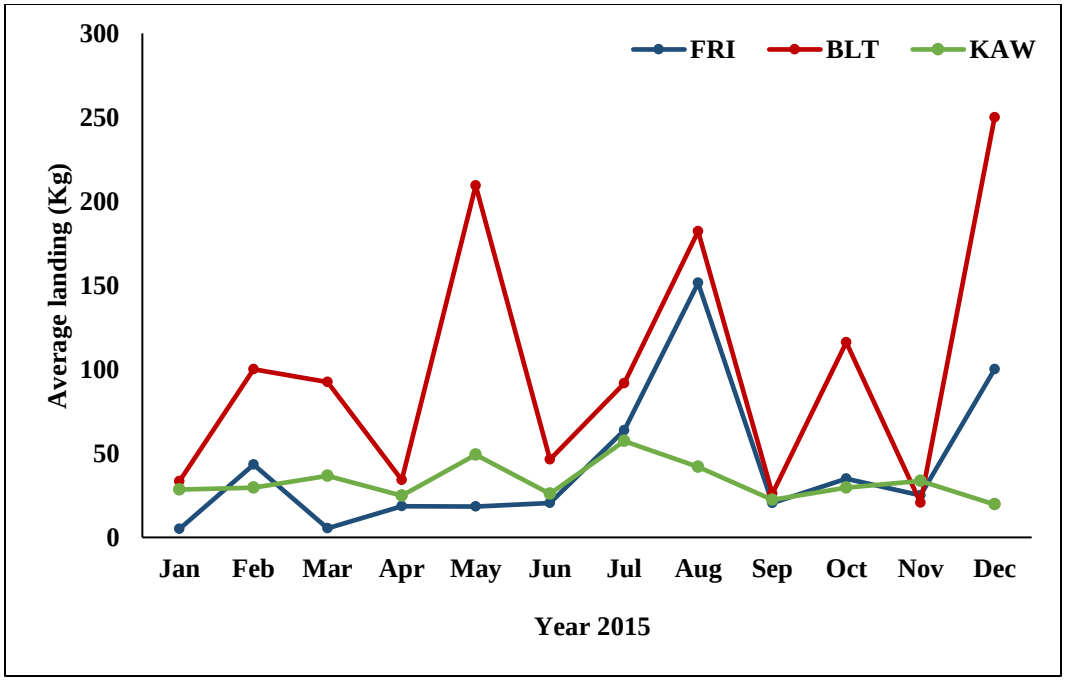

Figure 5. Neritic tuna monthly average catch landings of gillnet within EEZ in multiday tuna fishery in Sri Lanka in 2015

Conclusion

Neritic tuna total catch reduction and monthly average catch landings reduction in 2015 compare to 2014 shows the decreased trend of gillnet activities in multiday fisheries within EEZ. Also this might be due abundance of the major neritic tuna species within EEZ of Sri Lanka and international waters in Indian Ocean.

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