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CHANGE OF TUNAS SIZE DISTRIBUTION FROM TUNA PURSE SEINER LANDINGS IN PHUKET, THAILAND, FROM 2003 TO 2007[1]

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ABSTRACT

Port sampling surveys was conducted to collect fishing and biological data of tunas from tuna purse seine that unloaded tuna catch during 2003 to 2007 at Phuket deep-sea port. Sizes distributions of skipjack per quarter varied from 25 to 70 cm FL and 5 to 10 kg in weight. Change of mean FL in quarter 1 was increased from 50 cm in 2005 to be 52 cm in 2007 and in quarter 2 was increased from 2005 (44 cm) to 2007 (51 cm). Weight size distribution varied from 5 to 10 kg and mean weight was consistently 5 kg. Yellowfin have sizes distribution by quarter varied from 25 to 120 cm in FL and 5 to 35 kg in weight. Change of mean FL and weight by quarter were fluctuated from 54 cm to 90 cm, and 6 kg to 15 kg, respectively. Mean of sizes found decreased in 2007. Sizes distributions of bigeye varied from 20 to 100 cm and 5 to 20 kg by quarter. Change of mean FL and weight by quarter were increased in 2007. Length frequency distribution of 3 species showed multi mode in all quarter.

INTRODUCTION

Tuna fisheries in the Indian Ocean was initiated in 1973 by tuna longliners, tuna purse seiners and pole-and-line vessels operated by the French, Russian, Japanese and Taiwanese. A Japanese commercial purse seine fleet with 10 vessels, which formerly operated in the Western Indian Ocean, started to operate in the Eastern Indian Ocean in 1991. Their catches have been landed at Phuket deep-sea port since 1993 to present. Change in their ports of landing were desired due to economic reasons, Thailand has become the main frozen tuna market of the world. Advantages include a convenient infrastructure for transportation between the deep-sea port and the international airport.

Andaman Fisheries Research and Development Center (AFRDEC) have conducted the port-sampling of tuna purse seiner at Phuket deep-sea port, particularly collect fishing information and biological data of tunas. Sizes in length and weight of tunas have collected from unloading vessels since 1993 to present. The change of sizes in length and in weight distribution is an object in this study for monitoring the status of tunas from tuna purse seiner in the Eastern Indian Ocean.

RESULT AND DISCUSSION

Port sampling of tuna purse seine has been conducted at Phuket deep-sea port since 1994 to present. The main fleet that landing at there is Japanese tuna purse seine (Nootmorn *et al*., 2007). During 2003 to 2006, there was only one vessel landed for 2-6 trips/year. In the later year, 2007, they were five vessels with totally landed of 12 trips. The fishing ground found the area between latitude 05° 00´ N to 10° 41´ S and longitude 59° 12´ E to 98° 48´ E, mostly in the Eastern Indian Ocean (Panjarat *et al*., 2008). Skipjack is the main composition (>62 %), followed by yellowfin tuna (14-20 %) and bigeye tuna (14-22 %) (Panjarat *et al*., 2008).

MATERIAL AND METHOD

Analysis of tunas length (FL, cm) and weight (kg) frequency distributions from purse seine samples at Phuket deep-sea port from 2003 to 2007 was carried out with regardless sex condition. Regarding, the data on length of samples tunas in each month have been raised to the total catch of each gear by using the raising factor (RF).

$$RF = \frac{W_t}{W_s}$$

W_t = Total weight estimated (kg).

W_s = Sample weight (kg).

Skipjack: Sizes frequency distributions per quarter from 2003 to 2007 showed in Figure 1 in FL and Figure 2 in

[1] This paper presented at the 10 th Working party on Tropical Tunas, IOTC, held at Bangkok, Thailand, 23th to 31th October 2008.

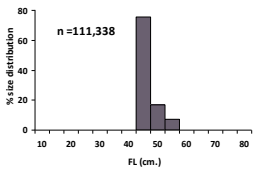
weight, which have FL and weight distribution varied from 25 to 70 cm and 5 to 10 kg. **In quarter 1**, range of FL distribution from 40 to 70 cm, 1 mode found in 2003 (45 cm), 2005 (50 cm), 2006 (50 cm), whereas two modes found in 2004 (45 cm and 60 cm), three modes reported in 2007 (40 cm, 55 cm and 70 cm). Change of mean found increased from 50 cm in 2005 to be 52 cm in 2007. Weight distribution varied from 5 to 10 kg, mean weight during 2003 to 2007 was 5 kg. **In quarter 2**, range of FL distribution from 30 to 70 cm, 2 modes found in 2005 (35 cm and 50 cm), 2006 (40 cm and 50 cm), and 2007 (50 cm and 70 cm). Change of mean was increased from 44 cm in 2005 to be 51 cm in 2007. Weight distribution varied from 5 to 10 kg, mean weight during 2005 to 2007 was 5 kg, same as Quarter 1. **In quarter 3**, range of FL distribution from 25 to 60 cm, 3 modes were 30 cm, 45 cm and 55 cm, only in 2007. Weight distribution varied from 5 to 10 kg, mean weight was 5 kg. **In quarter 4**, range of FL distribution from 30 to 70 cm, 1 mode found in 2003 (50 cm), whereas two modes found in 2004 (50 cm and 65 cm), 2005 (50 cm and 60 cm), and 2007 (45 cm and 60 cm). Change of mean FL found variably from 51 cm in 2003 to be 49 cm in 2007. Weight distribution varied from 5 to 10 kg, mean weight during 2003 to 2005 and 2007 was 5 kg.

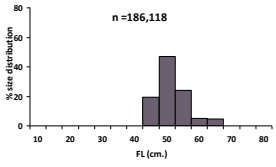
Yellowfin: Sizes frequency distributions per quarter from 2003 to 2007 showed in Figure 3 in FL and Figure 4 in weight, which have FL and weight distribution varied from 25 to 120 cm and 5 to 35 kg. **In quarter 1**, range of FL distribution from 35 to 105 cm, 1 mode found in 2003 (50 cm), whereas two modes found in 2004 (50 cm and 85 cm) and in 2006 (55 cm and 90 cm), three modes reported in 2005 (35 cm, 50 cm and 95 cm), four modes show in 2007 (40 cm, 50 cm, 75 cm and 90 cm). Trend of mean FL was increased from 54 cm in 2003 to be 78 cm in 2006, and decreased to be 63 cm again in 2007. Weight distribution varied from 5 to 25 kg, mean weight during 2003 to 2007 was increased from 6 kg in 2003 to be 11 kg in 2006, and deceased to be 8 kg in 2007. **In quarter 2**, range of FL distribution from 25 to 115 cm, small (25 cm to 65 cm) and large sizes (85 cm to 115 cm) were found in 2005 to 2007. Change of mean FL was varied from 45 cm to be 68 cm. Weight distribution varied from 5 to 30 kg. Change of mean weight during 2005 to 2007 was decreased from 11 kg in 2005 to be 9 kg in 2007. **In quarter 3**, range of FL distribution from 35-120 cm, 4 modes were 45 cm, 65 cm, 90 cm and 115 cm, only in 2007. Weight distribution varied from 5 to 35 kg, mean weight was 11 kg. **In quarter 4**, range of FL distribution from 40-120 cm, 3 modes found in 2004 (45 cm, 70 cm and 80 cm), and in 2007 (50 cm, 70 cm and 85 cm). Mean of FL varied from 56 cm (in 2004 and 2007) to 90 cm (in 2005). Weight distribution varied from 5 to 35 kg, and fluctuated same as mean of FL (6kg to 15 kg).

Bigeye: Sizes frequency distributions per quarter from 2003 to 2007 showed in Figure 5 in FL and Figure 6 in weight, which have FL and weight distribution varied from 20 to 100 cm and 5 to 20 kg. **In quarter 1**, range of FL distribution from 30 to 100 cm, 1 mode found in 2005 (50 cm), whereas two modes found in 2006 (50 cm and 70 cm) and in 2007 (45 cm and 65 cm). Trend of mean FL was increased from 53 cm in 2005 to be 59 cm in 2007. Weight distribution varied from 5 to 20 kg, mean weight during 2005 to 2007 was increased from 6 kg in 2005 to be 7 kg in 2007. **In quarter 2**, range of FL distribution from 25 to 100 cm, one mode show in 2005 (55 cm), two modes found in 2006 (40 cm and 60 cm) and 2007 (60 cm and 80 cm). Change of mean FL was increased from 53 cm in 2005 to be 59 cm in 2007. Weight distribution varied from 5 to 15 kg. Change of mean weight during 2005 to 2007 was increased from 5 kg in 2005 to be 8 kg in 2007. **In quarter 3**, range of FL distribution from 20 to 95 cm, 3 modes were 30 cm, 50 cm, and 70 cm only in 2007. Weight distribution varied from 5 to 20 kg, mean weight was 6 kg. **In quarter 4**, range of FL distribution from 35 to 85 cm, 1 mode found in 2004 (50 cm), two modes were in 2003 (45 cm and 60 cm) and in 2007 (50 cm and 70 cm), 4 modes were in 2005 (35 cm, 50 cm, 65 cm and 85 cm). Change of mean FL was increased from 47 cm in 2003 to be 54 cm in 2005, then, decreased again in 2007 (52 cm). Weight distribution varied from 5 to 20 kg. Trend of mean weight was same as mean FL, increasing from 4 kg in 2003 to be 8 kg in 2007.

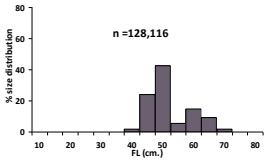
Quarter 1 Quarter 2 Quarter 3 Quarter 4

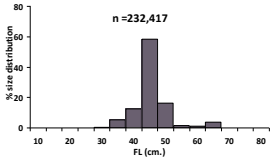
2003





2004





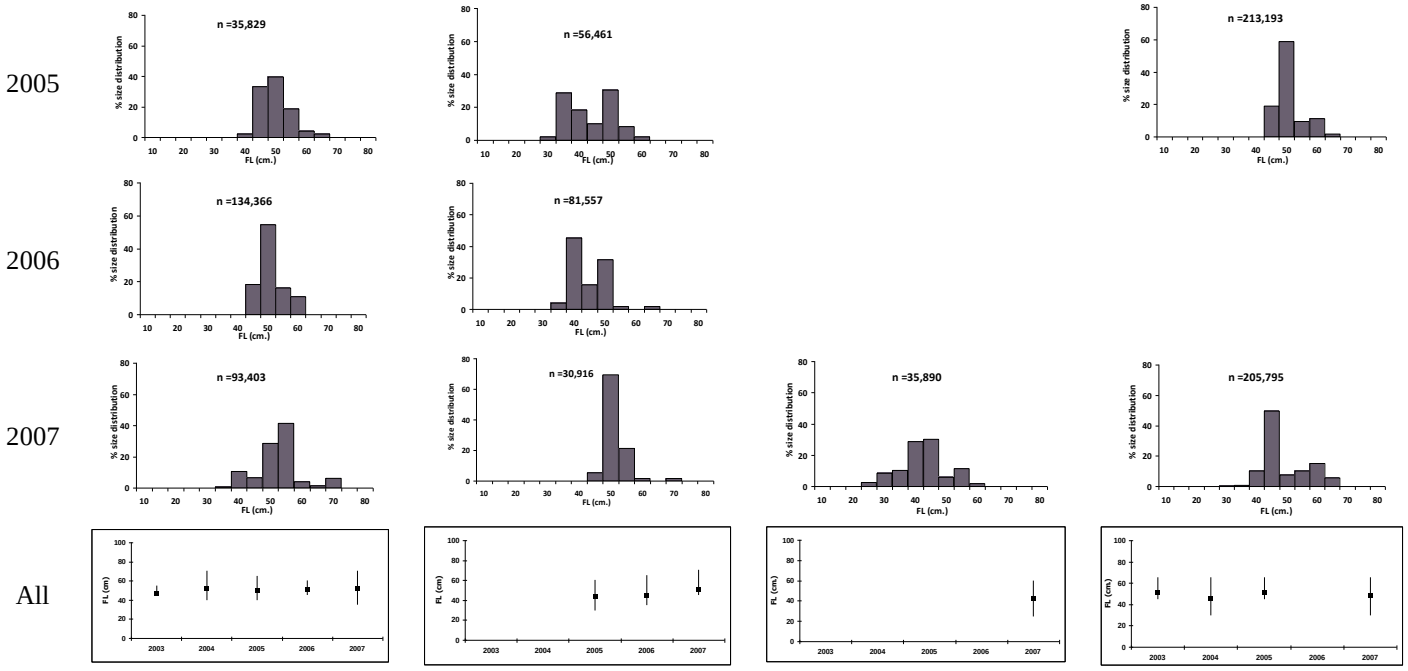


Figure 1. Size distribution and mean of FL of skipjack in each quarter during 2003 to 2007.

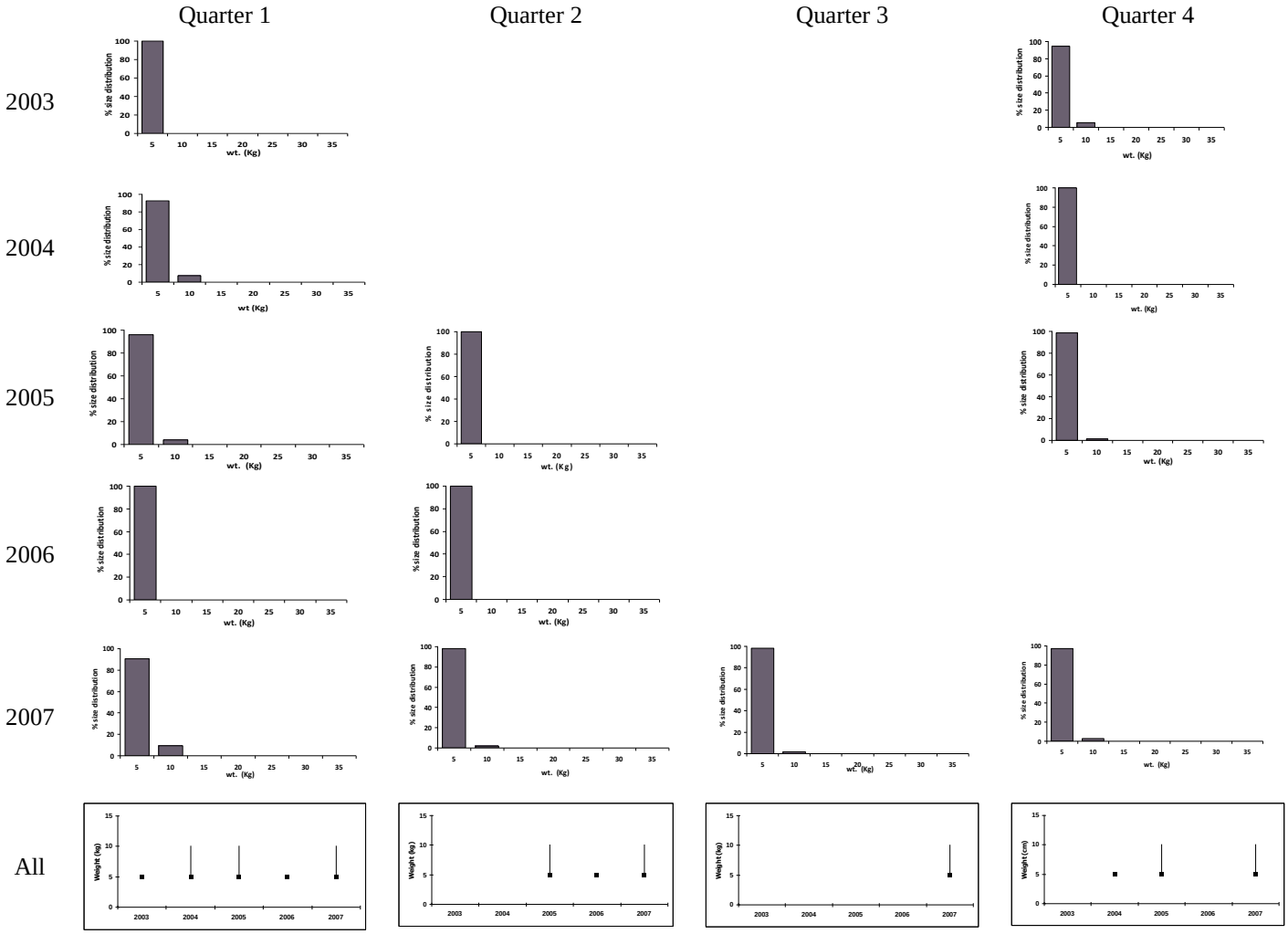


Figure 2. Size distribution and mean of weight of skipjack in each quarter during 2003 to 2007.

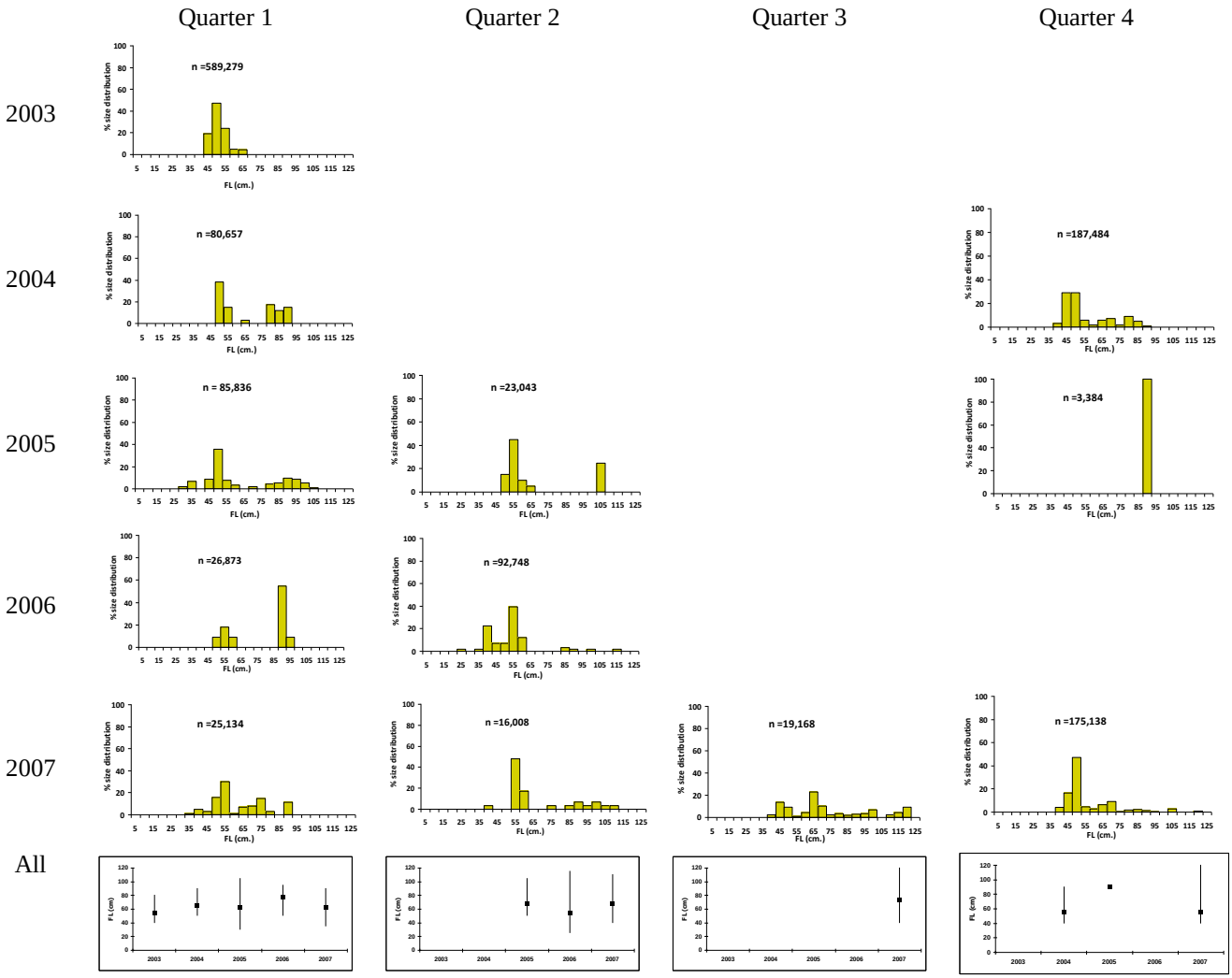
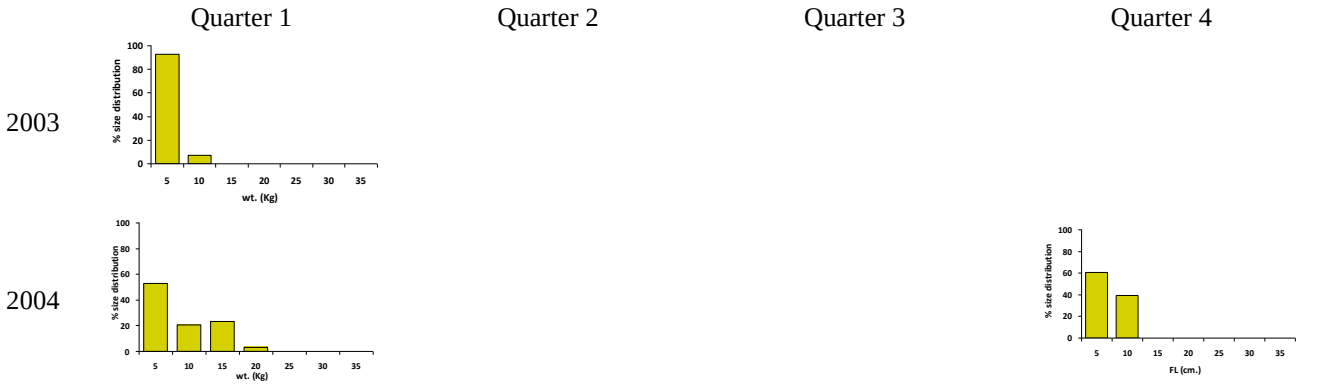


Figure 3. Size distribution and mean of FL of yellowfin in each quarter during 2003 to 2007.



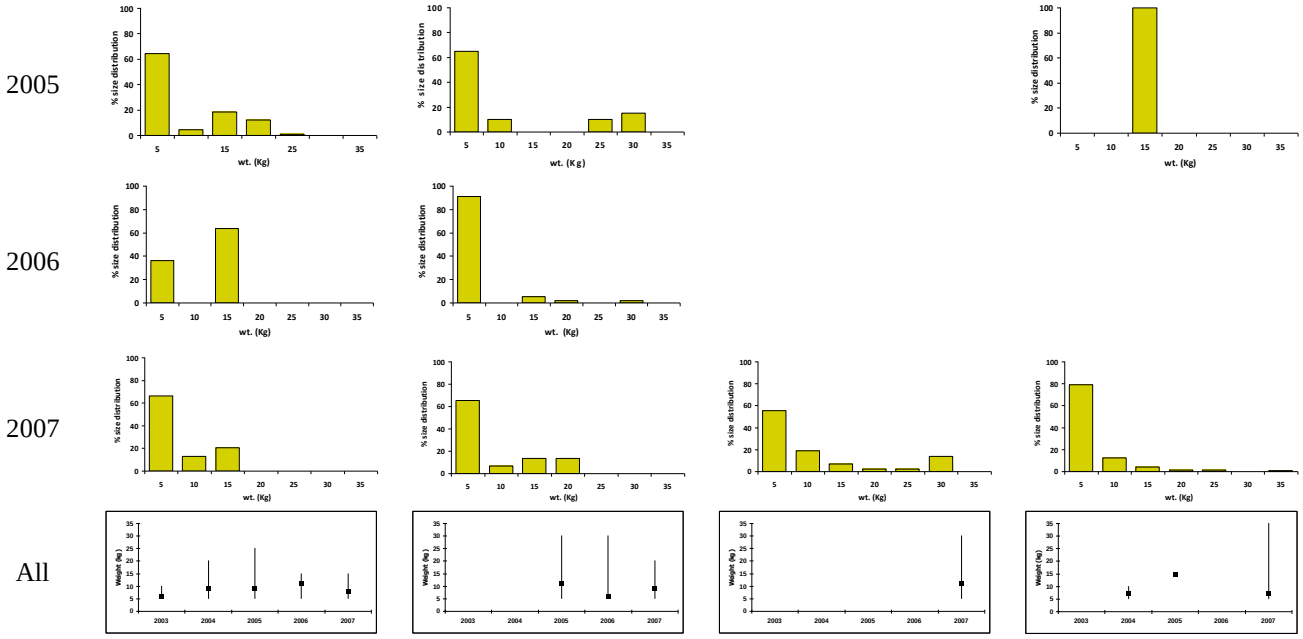


Figure 4. Size distribution and mean of weight of yellowfin in each quarter during 2003 to 2007.

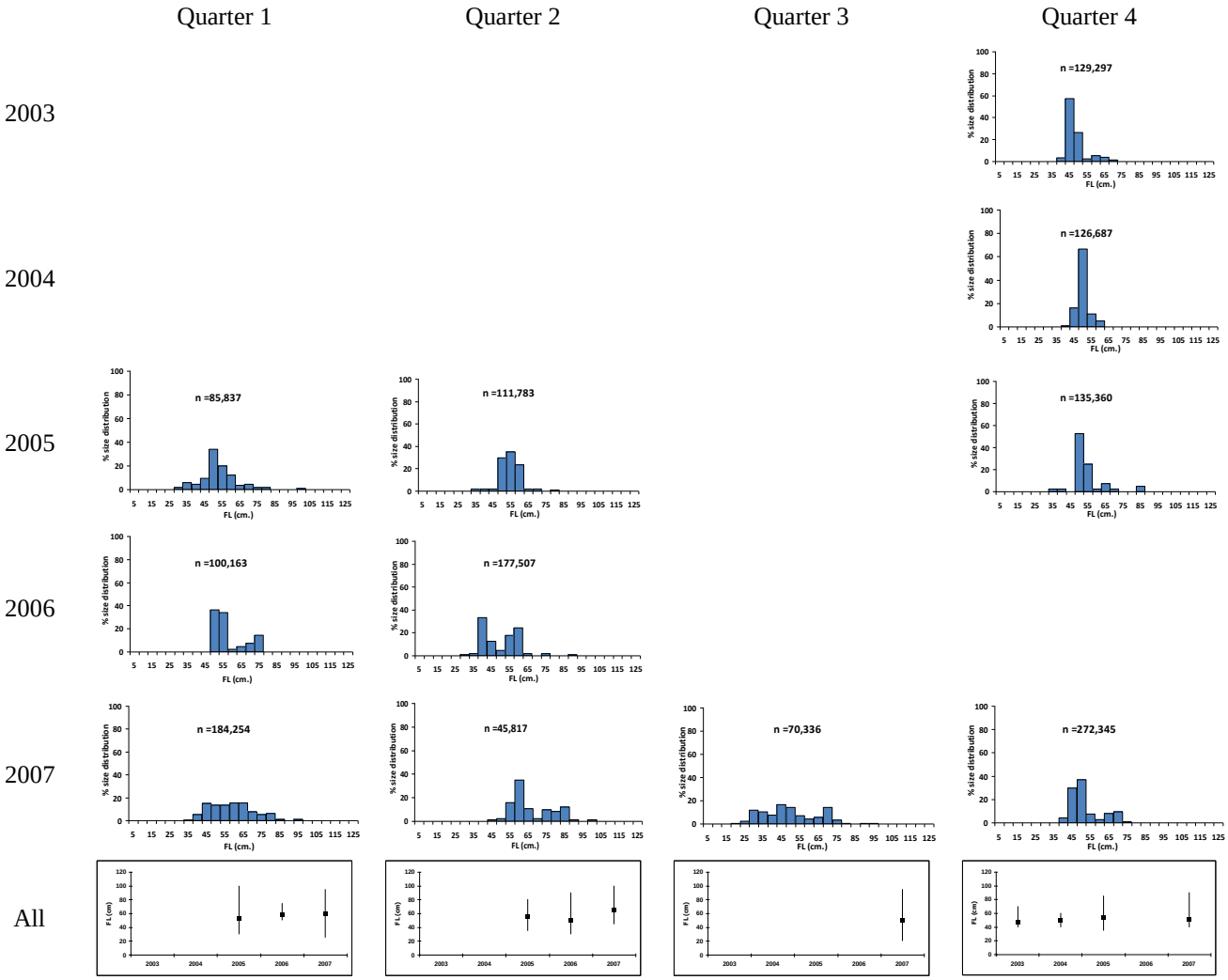


Figure 5. Size distribution and mean of FL of bigeye in each quarter during 2003 to 2007.

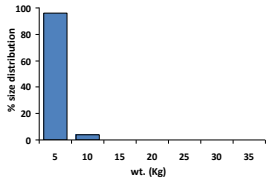
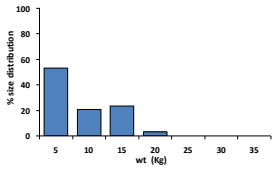
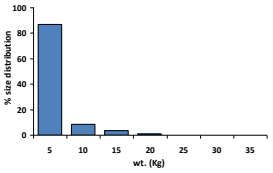
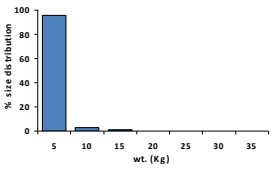
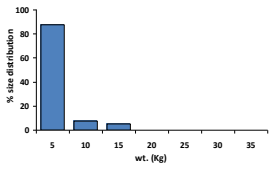
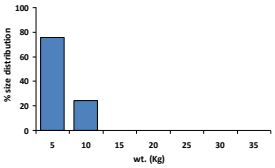
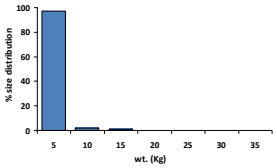
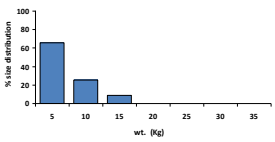
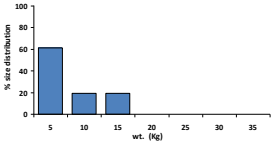
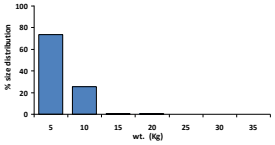
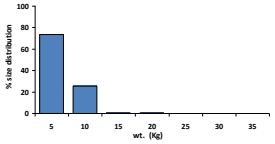
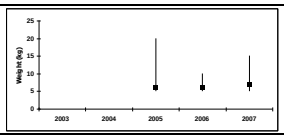
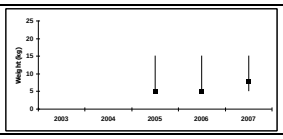
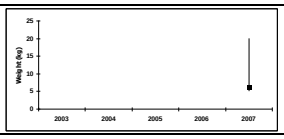
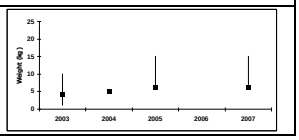
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2003				
2004				
2005				
2006				
2007				
All				

Figure 6. Size distribution and mean of weight of bigeye in each quarter during 2003 to 2007.

CONCLUSION

Skipjack: Sizes frequency distributions per quarter from 2003 to 2007 were FL and weight distribution varied from 25 to 70 cm and 5 to 10 kg. Multi mode of FL distribution found in all quarter during study period. Change of mean FL in quarter 1 was increased from 50 cm in 2005 to be 52 cm in 2007 and in quarter 2 was increased from 44 cm in 2005 to be 51 cm in 2007. While, weight distribution varied from 5 to 10 kg during 2003 to 2007 and mean weight was consistently 5 kg. **Yellowfin**: Sizes frequency distributions by quarter varied from 25 to 120 cm in FL and 5 to 35 kg in weight. Multi mode of FL distribution found in all quarter during study period. Change of mean FL and weight by quarter were fluctuated from 54 cm to 90 cm, and 6 kg to 15 kg, respectively. Mean of sizes found decreased in 2007.
Bigeye: Sizes distributions by quarter from 2003 to 2007 varied from 20 to 100 cm and 5 to 20 kg. Multi mode of FL distribution found in all quarter during study period. Both change of mean FL and weight by quarter were increased in 2007.

ENCOUNTERED PROBLEMS AND RECOMMENDATION

However, it seems to have some problems in connection with data collection and statistics these include.

1. Difficulties in obtaining the length frequency data for some months due to time limitation at the fishing ports(such as tuna for foreigner fleet, etc.).

2. The data collection and statistics address of tuna should have cooperated between the nation fleet and the nation port have been unloaded or transshipped (such as logsheet for foreigner tuna purse seine fishery in the Eastern Indian Ocean).

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