

Catch and Size Distribution of Neritic Tunas from Purse seine in Andaman sea Coast of Thailand, 2012

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ABSTRACT

Neritic tunas caught mainly from purse seine: Thai purse seine, light luring purse seine, purse seine with aggregating devices and Tuna purse seine along the Andaman Sea Coast of Thailand in 2012. Four species of neritic tunas were caught longtail tuna (*Thunnus tonggol*) 9.33 % kawakawa (*Euthynnus affinis*) 7.33%, frigate tuna (*Auxis thazard*) 3.62 % and bullet tuna (*Auxis rochei*) 2.99 % of total catch, although bullet tuna caught mainly in the northern part while frigate tuna caught mainly in the southern part of Andaman Sea. Total CPUE of neritic tunas was 545.59 kg/day, which compose of kawakawa 170.36 kg/day, longtail tuna 217.00 kg/day, bullet tuna 69.47 kg/day and frigate tuna 84.16, kg/day. The highest CPUE was caught from Tuna purse seine. Mean of fork length of kawakawa was 24.88 cm (10-59.5cm), longtail tuna was 36.69 cm (14.0-30.0cm), bullet tuna was 23.39 cm (12.0-39.0cm) and frigate tuna was 30.86 cm (11.5-43.5cm). Tuna purse seine was caught the bigger size of neritic tunas than other gears.

INTRODUCTION

In Thailand, neritic tunas were exploited by variety of fishing gears. The main fishing gears were the purse seines. At present fishing gears and techniques have been developed by using light luring techniques, fish aggregating devices and advance technology such as fish finder equipments were introduced to increase efficiency of catching. Small pelagic fishes such as Indo-Pacific mackerel including neritic tunas are gaining more importance economically. They had become the main target species for Thai fishermen since 1975 because of attractive prices offered by domestic consumer and fish canneries. According to the fisheries statistics, the total catches of neritic tunas in Thai waters in the period from 2000 to 2007 were range 102,909 to 138,917 ton and had been decreased about three times in recent 3 year as compared with 36,343 ton in 2008, 38,292 ton in 2009 and 36,343 ton in 2010 (Department of Fisheries, 2000-2010). At present, Thailand is the main supplier of canned fish and other fish products to foreign markets throughout the world. Anyhow, the rapid fisheries development may lead into the deterioration of neritic tunas stocks in Thailand. Thus, studies on small pelagic and neritic tunas stocks are urgent in finding out the current problems, situation and status.

MATERIALS AND METHODS

Port sampling along the Andaman Sea Coast of Thailand in Ranong, Phang Nga, Phuket, Krabi, Trang and Satun provinces. has been conducted to collect biological data of neritic tunas, e.g species composition, fishes were random sampling to measured the individual body weight (kg), fork length (cm) during January to December 2012. For fishing data, e.g catch (ton), effort (number of trip), fishing areas, number of hauls were taken by interviewed from fishing master.

RESULT

1. FISHING GEARS AND FISHING GROUND

Purse seines of neritic tunas fishery along the Andaman sea coast of Thailand are basically classified in to 3 main types namely, Thai purse seine (TPS), light luring purse seine (LPS) and purse seine with fish aggregating devices (FADs) and Tuna purse seine (TUN). Fishing boats of TPS, LPS, FADs are 21-25 m LAO with 300-500 hp of power engine. They use same type of net: black nylon with mesh size 25 mm, length of net 800-1,000 m, depth of net 80-100 m. While TUN is the largest purse seine operated with black nylon net, 1,800-2,000 m long and 120-150 m deep with the mesh size 50-98 mm. Fishing boat are 28-30 m LAO with 300-520 hp of mai, engine. (SEAFDEC,1986).

The difference of TPS, LPS, and FADs was classified that TPS caught fish by purse seine and using fish finder, such as eco-sounder and sonar to detect fish school. While LPS and FADs caught fish school by purse seine and using one or two light-luring boats to aggregated fish.

LOA of light-luring boats ranged 14-16 m, using 100-150 hp of power engine and 40 kw of electric generator with 50-56 lamps of 400-500 w. The FADs caught fish by using fish aggregating devices and light luring boat. Fish aggregating devices constructed of bamboo poles, rope and coconut leaves fastened to a concrete block.

The fishing grounds were distributed along the Andaman Sea Coast. Whereas, the main fishing ground of LPS and TPS were found along the coast of Ranong, Phang-nga, Phuket and Krabi provinces, while FADs was operated in Phang-nga province and Trang to Satun provinces at 30-60 m depth (Figure 1). Boonragsa (1990) reported, fishing ground of neritic tunas was distributed over the offshore and along the coast, depth of water more than 40 m. The fishing season was all year round where the highest season was during November to May.

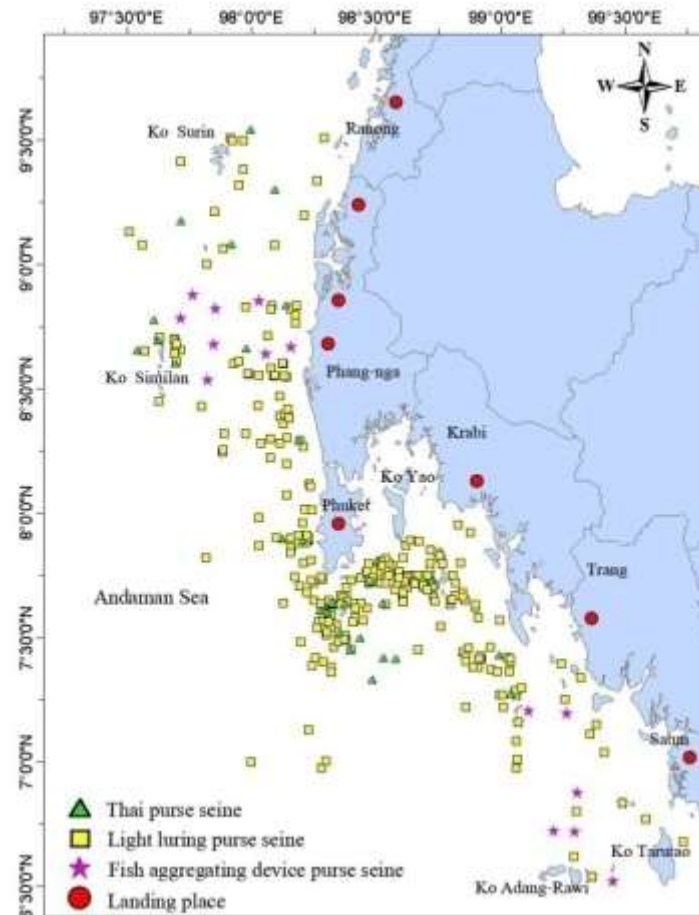


Figure 1 Sampling area and fishing grounds of purse seine along the Andaman Sea Coast of Thailand

The number of registered purse seine by province along the Andaman sea coast of Thailand showed as table 1. In 2011 total of registered purse seine was 258 which shared 14% of all registered gears.

Table 1 Number of purse seine registered by province along the Andaman sea coast of Thailand 2007-2011

Province	2006	2007	2008	2009	2010	2011
Ranong	34	22	15	26	45	49
Phangnga	24	21	45	46	63	39
Phuket	34	22	17	29	30	21
Krabi	8	7	3	8	10	15
Trang	67	67	66	82	79	77
Satun	80	73	62	79	85	57
Total	247	212	208	270	312	258

Source: DOF, 2013

2. CATCH COMPOSITION

There are four species of neritic tunas commonly found in the Andaman sea coast of Thailand, namely kawakawa (*Euthynnus affinis*), longtail tuna (*Thunnus tonggol*), bullet tuna (*Auxis rochei*) and frigate tuna (*Auxis thazard*). The percentage of neritic tuna was 23.27 of total catch from purse seine breakdown to longtail tuna 9.33%, kawakawa 7.33%, frigate tuna 3.62% and bullet tuna 2.99% (Figure 2).

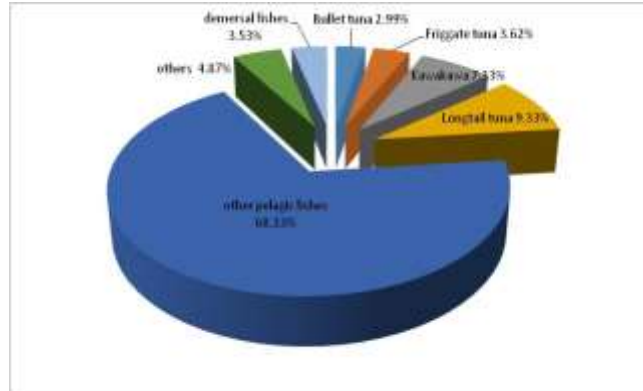


Figure 2 Catch composition of purse seiner along the Andaman Sea Coast of Thailand in 2012

The catches of neritic tunas by type of fishing gear in Andaman Sea are shown in Table 2 described TUN which neritic tunas are the main target species caught 89.84% of neritic tunas, the highest was longtail tuna 63.28%, frigate tuna 14.89% and kawakawa 11.67%. For the common purse seiner TPS caught neritic tunas 34.28% composed of longtail tuna 22.49%, kawakawa 6.57%, frigate tuna 3.84% and bullet tuna 1.38%. FADs caught 18.81% breakdown to kawakawa 7.26%, longtail tuna 4.23%, bullet tuna 4.13% and frigate tuna 3.19%. LPS caught 16.29%, kawakawa (7.02%), longtail tuna (4.29%), bullet tuna (2.98%) and frigate tuna (2.63 %).

Table 2 Percentage of neritic tunas caught by type of purse seine along the Andaman Sea Coast of Thailand in 2012.

Species	FADs	LPS	TPS	TUN
Bullet tuna	4.13	2.98	1.38	
Frigate tuna	3.19	2.63	3.84	14.89
Kawakawa	7.26	7.02	6.57	11.67
Longtail tuna	4.23	4.29	22.49	63.28
Total	18.81	16.92	34.28	89.84

3. CATCH PER UNIT EFFORT

Monthly catch per unit effort (kg/day) of each species from purse seine shows in Table 1. CPUE was ranged between 239.61-1223.23 kg/day The peak of CPUE shows in January (534.51 kg/day) to May 794.74 kg/day) and the highest CPUE shows in October (1223.23 kg/day). Kawakawa, longtail tuna and frigate tuna were caught throughout the year while bullet tuna not found in September and October.

Table 3 CPUE (kg/day) of neritic tunas caught by purse seine along the Andaman Sea Coast of Thailand in 2012.

CPUE (kg/day)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bullet tuna	8.37	26.89	65.40	160.40	460.01	50.98	51.11	0.00	0.00	0.64	0.48	158.27
Frigate tuna	132.56	147.54	28.93	171.52	96.78	28.31	53.00	19.65	80.97	118.08	49.27	56.83
Kawakawa	273.49	156.53	93.91	144.44	236.75	270.97	77.72	96.04	150.41	275.59	94.24	115.50
Longtail tuna	120.08	142.52	307.90	100.57	1.19	90.65	135.85	123.91	223.69	828.92	98.87	1.14
Total	534.51	473.48	496.14	576.92	794.74	440.91	317.68	239.61	455.06	1223.23	242.86	331.74

Total CPUE of neritic tunas was 540.99 kg/day, which compose of kawakawa 170.36 kg/day, longtail tuna 217.00 kg/day, bullet tuna 69.47 kg/day and frigate tuna 84.16 kg/day. The highest CPUE was caught from TUN 1892.26 kg/day (Table 4).

Table 4 CPUE (kg/day) of neritic tunas by type of purse seine along the Andaman Sea Coast of Thailand In 2012.

Species	FADs	LPS	TPS	TUN	All
Bullet tuna	114.8	63.48	15.18		69.47
Frigate tuna	88.44	56.08	42.23	313.64	84.16
Kawakawa	201.63	149.47	72.30	245.84	170.36
Longtail tuna	117.48	91.23	247.39	1332.78	217.00
Total	522.35	360.26	377.10	1892.26	540.99

4. SIZE DISTRIBUTION

Result of sampling survey in 2012 shows that the size (fork length) of kawakawa, longtail tuna, frigate tuna and bullet tuna caught by purse seine as presented below.

4.1 Kawakawa

Size distribution of kawakawa caught by purse seine varied between 10.0-59.5 cm and average 23.76 cm. with mode at 10.5-13.5 cm and 24.5-27.5 cm (Figure 3).The average size from TPS was 23.63 cm, while modes of length were 19.5-20.5 cm and 35.5-39.5 cm. LPS caught the average size 22.34 cm, whereas modes of length were 10.0-13.0 cm, 18.5-31.5 cm. FADs caught the average size 24.95 cm, while modes of length were 10.5-15.5 cm, 18.5-26.5 cm and 29.5-32.5 cm. The average size from TUN was 38.99 cm with mode at 37.5-41.5 cm Comparing to size at first mature (Lm) at 43.0 cm (Yasaki, 1992) found the percentage of length frequency caught by TPS, LPS, FADs and TUN were smaller than equal 99.85, 98.20, 97.68 and 93.87 respectively (Figure 4). The biggest size of kawakawa were caught by TUN while size from TPS, LPS and FADs were not different.

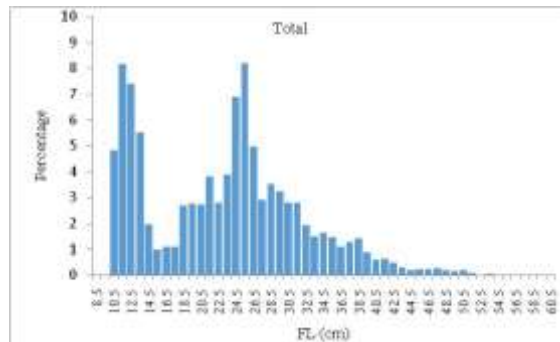


Figure 3 Length frequency of kawakawa caught by purse seiner in 2012.

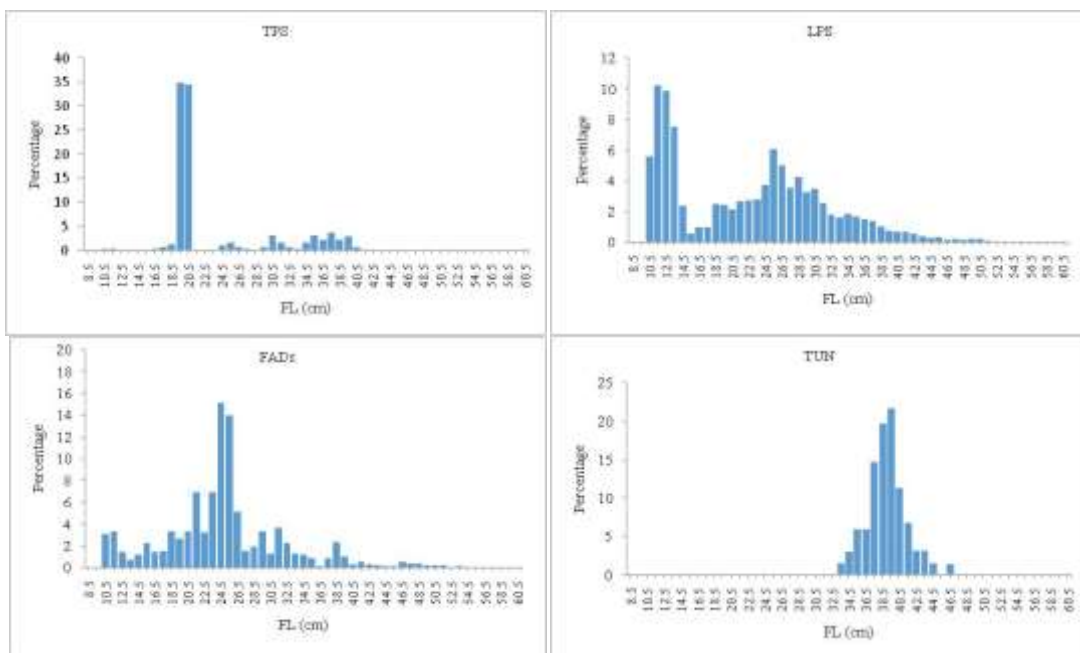


Figure 4 Length frequency of kawakawa caught by type of purse seiner in 2012.

4.2 Longtail tuna

Size distribution ranges from 13.5-60.5 cm average 36.17 cm in the fork length from all purse seine with mode at 18.5-21.5 cm, 27.5-30.5 cm and 34.5-43.5 cm (Figure 4) The average size from TPS was 36.86 cm, while modes of length were 15.5-19.5 cm and 34.5-43.5 cm. LPS caught the average size 32.71 cm, whereas modes of length were 17.5-21.5 cm and 27.5-44.5 cm. FADs caught the average size 35.67 cm, while modes of length were 21.5-23.5 cm, 27.5-30.5 cm and 32.5-40.5 cm. The average size from TUN was 39.35 cm with mode at 33.5-36.5 cm and 38.5-40.5 cm. Base on Lm of longtail tuna at 51.1 cm (Abdussamad *et al*, 2012) showed that mostly of longtail tuna caught by purse seine were immatured (Figure 6).

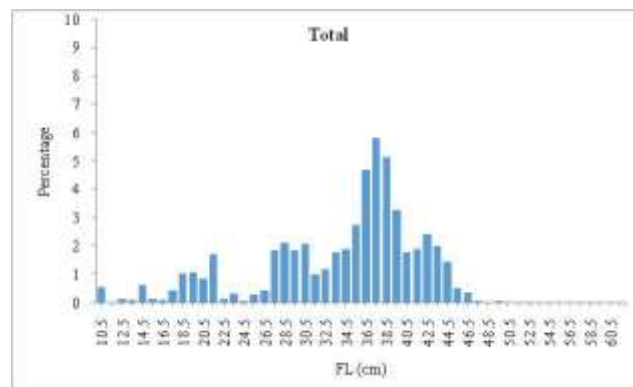


Figure 5 Length frequency of longtail tuna caught by purse seiner in 2012.

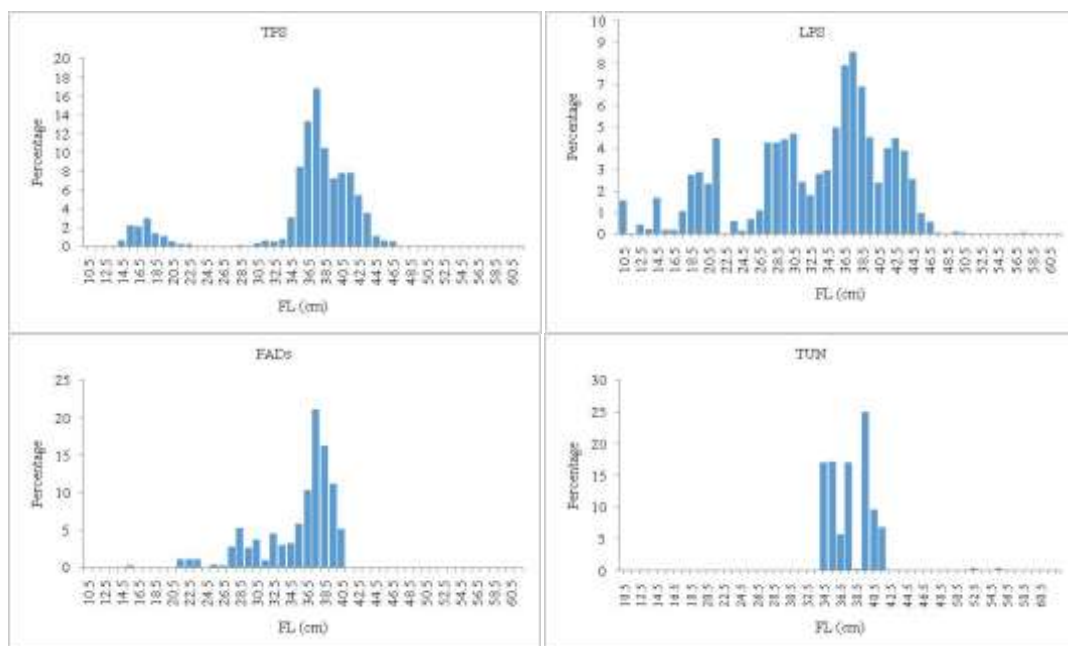


Figure 6 Length frequency of longtail tuna caught by type of purse seiner in 2012.

4.3 Frigate tuna

Size distribution varied from 10.5-43.5 cm, average 29.50cm with mode at 20.5-31.5 cm, and 36.5-39.5 cm (Figure 7) The average size from TPS was 31.45 cm, while modes of length were 12.5-18.5 cm, 27.5-31.5 cm and 36.5-38.5 cm. LPS caught the average size 28.06 cm, whereas modes of length were 20.5-31.5 cm and 36.5-37.5 cm. FADs caught the average size 28.14 cm, while modes of length were 15.5-26.5 cm, and 29.5-31.5 cm. The average size from TUN was 37.53 cm with mode at 36.5-40.5 cm. Comparison with Lm of frigate tuna 30.5 cm (Yasaki and Arce, 1994), so that number of immatured frigate tuna caught by TPS, LPS and FADs reached 44.67, 84.07 and 77.19% respectively, whilst mostly of frigate tuna caught by TUN were matured (Figure 8).

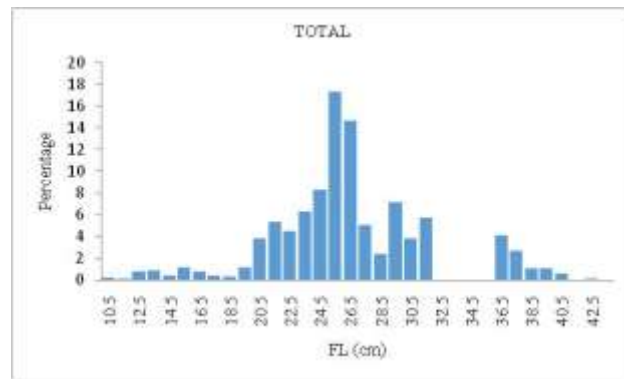


Figure 7 Length frequency of frigate tuna caught by purse seiner in 2012.

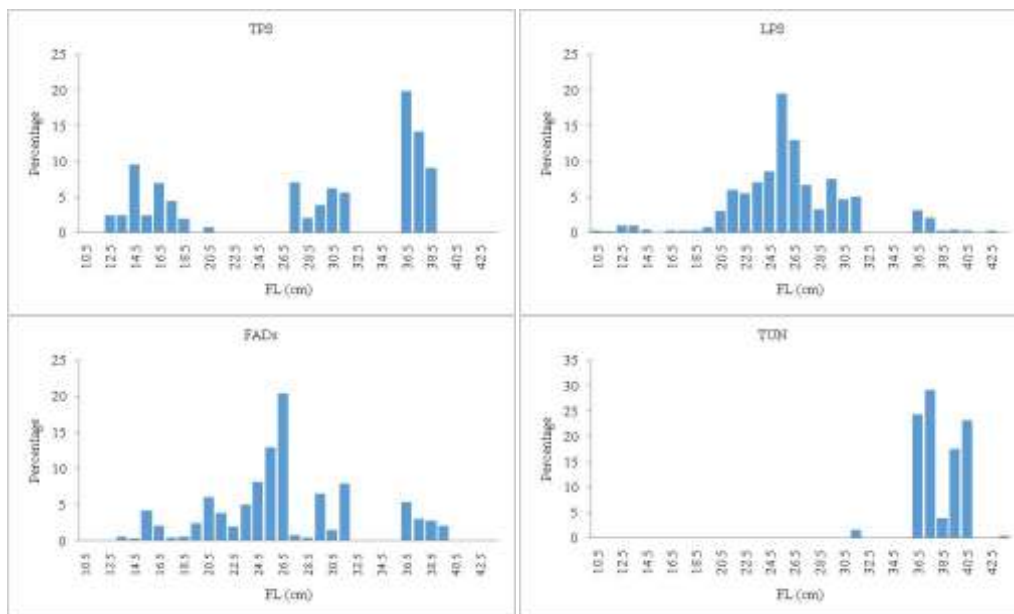


Figure 8 Length frequency of frigate tuna caught by type of purse seiner in 2012.

4.4 Bullet tuna

Size distribution varied from 10.0-39.0 cm, average size 23.19 cm with mode at 20.0-25.0 cm (Figure 7) average size that caught by TPS, LPS and FADs was 22.84 cm, 23.48 cm and 22.84 cm, major modes of fork length was 22.0-26.0 cm, 22.0-25.0 cm and 20.0-24.0 cm, respectively. TPS and FADs caught 89.06 and 68.5% of smaller than Lm as 24.0 cm (Yasaki and Arce, 1994) whilst LPS caught 52.94% immature (Figure 10).

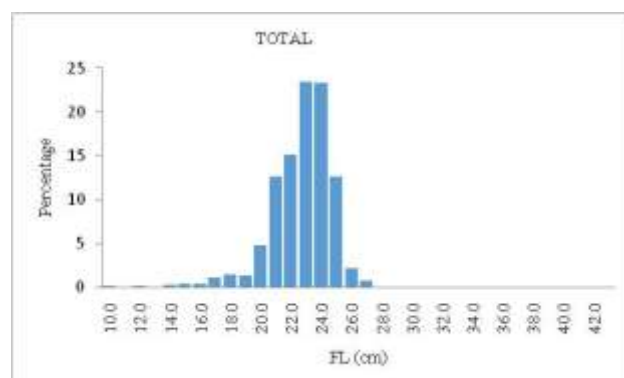


Figure 9 Length frequency of bullet tuna caught by purse seiner in 2012.

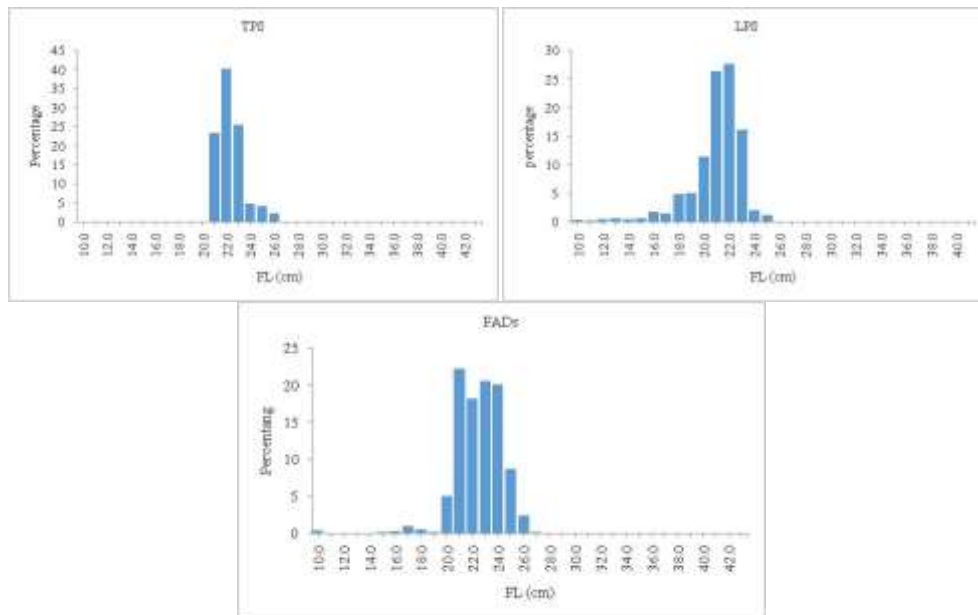


Figure 10 Length frequency of bullet tuna caught by type of purse seiner in 2012.

5. CONCLUSION

The main fishing gears for catching neritic tunas in Thailand are purse seines which consist of Thai purse seine, light luring purse seine, purse seine with fish aggregating devices and tuna purse seine. The four main species of neritic tunas commercially caught are longtail tuna (*Thunnus tonggol* Bleeker, 1851); kawakawa (*Euthynnus affinis* Cantor, 1850), bullet tuna (*Auxis rochei* Risso, 1810) and frigate tuna (*Auxis thazard* Lacépède, 1803).

Fishing ground of LPS and TPS were found along the coast of Ranong, Phang-nga, Phuket and Krabi provinces, while FADs was operated in Phang-nga province and Trang to Satun provinces at 30-60 m depth. The fishing season was all year round where the highest season was during November to May. Mostly of neritic tuna caught by purse seine are immature except longtail tuna caught by tuna purse seine.

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