



ISC/08/Plenary/07

*8th Meeting of the ISC
July 22-27, 2008
Takamatsu, Japan*

**Recent Status of Chinese-Taipei Tuna Fisheries in the North Pacific
Region for 2006¹**

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July 2008

¹Prepared for the Eighth Meeting of the International Scientific Committee on Tuna and Tuna-like Species in the North Pacific Ocean (ISC), 22-27 July 2008, Takamatsu, Japan. Document not to be cited without permission of the authors.

Chinese Taipei Tuna and Tuna-like Fisheries in the North Pacific Ocean

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ABSTRACT

Distant water longliners (DWLL, ≥ 100 GRT) and Offshore longliners (OSLL, < 100 GRT) are the two major tuna fisheries operating in the North Pacific by Chinese-Taipei. The number of DWLL vessels operating in the entire Pacific Ocean in 2005 was 133, but in 2006 and 2007 reduced to 117 and 97, respectively. Catches of its major target species albacore in the North Pacific were gradually decline from a level of 9,000 t in 1997 to 2,465 t in 2007. The decline in albacore catches mainly due to the decline of fishing effort. Catches of swordfish were more than 1,000 t during 2001-03 due to the development of bigeye-target fleet but were declined to the level of 350-450 t in 2005-07 by the decline of fishing efforts. For OSLL fishery, catches of albacore is generally low between 300-500 t during 2005-07. Catches of bluefin tuna were at the low level of 1150-1400 t during 2005-07 with an increase in 2007. Swordfish catches were at the level of 3600-4000 t during 2005-07, including the catches by foreign-based OSLL that landed in foreign ports. Size data from DWLL was obtained from logbooks, and data from OSLL was collected through sampling program. The average sizes of albacore are 86cm and 98cm for DWLL and OSLL, respectively, and for swordfish, average sizes are 161cm and 135cm for DWLL and OSLL, respectively. A pilot port sampling program was launched in foreign ports like Pago Pago, Suva and Levuka since 2005. Observer program was continuously conducted with increased number of observers from 2 in 2005 to 7 in 2006 and to 8 in 2007 (including ALB and BET observation trips). To improve logbook coverage and data quality of OSLL, an OSLL data improvement program was launched since mid-2007. Long-term contracted staffs have been dispatched to 5 domestic fishing ports for the program.

1.0 FISHERIES AND CATCHES

1.1. General overview

There are two Taiwan tuna fisheries operating in the North Pacific Ocean: the distant water longline (DWLL) and the offshore longline (OSLL) fisheries. Since the distant water purse seine fleets operate mainly in the equatorial areas, the following introduction focuses on DWLL and OSLL fisheries. The catches of the major species concerned by ISC and the data collection system of these two fisheries are provided in the following sections:

1.2. Distant water longline fishery

The DWLL vessels refer to those vessels larger than 100 gross registered tons (GRT) mostly operate in the high sea areas or in the EEZs of coastal countries under license. The total number of vessels operating in the Pacific Ocean in 2006 was 117, and the number of vessels reduced to 97 in 2007.

Before 1995, the catch of albacore in the North region was very low for Taiwanese fleet. For the opportunities of access agreements to South Pacific were constrained, the Taiwanese fishing efforts and catch in the North region increased thereafter. The ALB catch of 2006 estimated as 3,848 mt, a continuous decrease since 2000, and the preliminary catch of 2007 estimated as 2,465 mt, a slight decrease from previous year.

For DWLL fisheries, the catch of bluefin tuna in the North Pacific has been very minimal and the catches were less than 1 mt in recent years. Before 2000, the catch of swordfish in the North Pacific region was low and less than 100 mt. Thereafter, the catch increased substantially to more than 1,000 mt in 2001 to 2003 for the increasing of fishing efforts on BET, but declined below than 1,000 mt in 2004 to 2007 period.

The effort distribution of Taiwanese DWLL vessels operated in the North Pacific region during 2003-2006 is shown in Figure 1. These vessels fish for northern albacore seasonally from September to next March, and shift to the South Pacific fishing for southern albacore from April to August.

1.3. Offshore longline fishery

The offshore tuna longline (OSLL) vessels generally refer to those vessels smaller than 100 GRT (mostly 50-70 GRT). These vessels generally operate in the waters of Taiwan. Table 1 shows the OSLL fishery's catches of the main species concerned and being considered as from the EEZ of Taiwan. From Table 1, the catch of albacore is generally low and fluctuated between 100 and 900 mt in recent ten years. A preliminary estimate of 2007 catch is 321 mt. The catch of swordfish of 2006 was estimated as 2,587 mt and a preliminary estimate for 2007 is 2,907 mt. And the catch of bluefin tuna shows an increasing trend during recent ten years, up to the peak record of 3,000 mt in 1999 and reduced to a level of 1,500 to 2,000 mt after year 2000. The catch of 2005 was estimated at 1,368 mt, but declined to 1,148mt in 2006. The preliminary catch of 2007 estimated is 1,401 mt.

The fishing effort distribution of OSLL vessels based at domestic ports during 2005-2007 is shown in Figure 2. The operation was mostly located in southeast of Taiwan waters and northeast of the Philippine Islands. Some OSLL vessels based in Suao, locates in the northeast coast of Taiwan, operating in the area east of 150 E and their catches are in frozen form as the same form as the catches transported from the small tuna longline fishing vessels operating in the eastern Indian Ocean and the south Pacific Ocean.

1.4. Size samples from the longline fisheries

The size measurements on major tuna and tuna-like species caught by DWLL and OSLL fisheries in the North Pacific region are shown in Figure 3.

For DWLL fisheries, the catch size data is recorded in logbook. The size numbers of albacore and swordfish were 152,998 and 6,939 respectively from 2005-2007. The albacore caught by

DWLL for 2005-2007 ranged from 40 to 130 cm with a clear peak in the range of 80-90 cm. The low jaw fork length frequency distributions of swordfish shows one mode in the range of 120-180 cm.

For OSLL fisheries, the size numbers of albacore and swordfish sampled from domestic fishing ports were 1,167 and 1,600 respectively from 2005-2007. The catch size of albacore is one mode located between 90-110 cm. The low jaw fork length frequency distributions of swordfish is mainly between 100-150 cm, and the fork length distribution of bluefin tuna is mainly between 210-245 cm.

2.0 FISHERY MONITORING AND DATA COLLECTION

2.1 Fishery-dependent data collecting

Distant water longline fishery

Two types of fishery statistical data are routinely collected from DWLL fishery: the commercial data (for estimation of total catch), and the logbook data (for stock assessment purposes). Several sources of commercial information were available from traders, Taiwan Tuna Association, Japanese market, and so on. After cross-checking and compilation, the commercial information was used to estimate total catches of the Category I data.

The logbook data include each set of catch in number and weight by species, effort deployed, fishing location, and so on, as well as the size measurement of the first 30 fish caught each day. Categories II and III data were all compiled from this data set.

Offshore longline fishery

As mentioned in previous section, two categories of OSLL are defined: OSLL that based in Taiwan and unloading their catches at domestic fishing ports (domestic-based OSLL), and that based and unloading catches at foreign ports (foreign-based OSLL). For domestic-based OSLL, the commercial landing records from local fishing markets provide the best information for estimating the ISC Category I data of total catches. Since, there was not much information to estimate total catches for foreign-based OSLL, preliminary estimations were basically made from fishing vessels activities and importing statistics to the Japanese markets. In addition, some OSLL vessels fishing in the South Pacific or Eastern Indian Ocean, their catch of billfish were transshipped back to Taiwan by containers, reefers or fishing vessels in frozen form, and unloaded/auctioned in the domestic markets. These catches in frozen form were excluded from the estimation of ISC category 1.

Logbooks of OSLL fishery have been collected since 1997, though at this stage, the recovery rate of about 2% to 5% is too low to be compiled to Category II data, and insufficient for the purposes of stock assessment. To improve the coverage of logbook, Fisheries Agency has launched a data improvement program on domestic-based OSLL fishery in April 2007.

2.2 Fishery-independent data collection

2.2.1 Port sampling

Taiwanese DWLL vessels fished for northern albacore only seasonally from about September to next March, and based in Pago Pago, South Pacific. In 2005, 4 port samplers were sent to carry out the port-sampling in Pago Pago, Suva and Levuka, where the fish size was measured, muscle tissues collected and skippers interviewed. In 2006, 2 port samplers were sent to carry out the port-sampling in Pago Pago.

For domestic-based OSLL, port sampling at domestic fish markets has started in 1997, collecting size data of the major tuna species (mainly bigeye and yellowfin tunas). In 2004, we carried out a pilot port sampling in Davao, Philippines in the North Pacific. However, the catch of Taiwan in North region was provided by domestic-based OSLL, there exists a need to augment a port sampling program at domestic ports. Through the data improvement program, port sampling on both the trip information (location, catches and effort) and size of major tuna species in Tong-Kang, Suao and Sin-Kang, the domestic tuna-fishing main ports, has been, therefore, independently conducted. These data were compiled and made available for the scientific uses.

2.2.2 Observer program

The experimental observer program for three Oceans was launched in 2001. There were 2 trips dispatched to the North Pacific region respectively in 2004 and 2005, the coverage rate for NPALB fishery is about 8%, and further increased to 7 trips in 2006 and 8 trips in 2007, to collect fishery data and size measurements, otoliths, and gonad samples of albacore.

2.2.3 VMS monitoring

Vessel monitoring system (VMS) has been installed voluntarily on some longliners prior to 2005. For better management of tuna fishery resources, all the large-scale vessels were required to install VMS since 2005. Besides of better monitoring the vessel activities, the data was used to verify the logbook data of 2005-2007 and to improve the data quality.

2.2.4 Enhancement in OSLL data collection at domestic ports

To improve logbook coverage and data quality of OSLL, an OSLL data improvement program was launched since mid-2007. Long-term contracted staffs have been dispatched to 5 domestic fishing ports for the program. Their work included collection of logbooks from fishermen, interview with fishermen to obtain fishery-related information and conduction of size sampling program. Logbook coverage rate is expecting to be improved in the near future subsequently.

3.0 RESEARCH

Among the billfish species, National Taiwan University (NTU) has completed studies on population dynamics and stock assessment for swordfish and sailfish and is currently conducting a stock assessment study on blue marlin. Through collaborations with the Fisheries Research Institute (FRI) of Council of Agriculture (COA), and funding from the Fisheries Agency of COA, NTU is also studying the age/growth and reproductive biology of black marlin, and collecting biological data from striped marlin. A billfish tagging program has also being conducted by FRI.

Table 1. Catch estimates of North Pacific albacore, bluefin tuna, swordfish and marlins by Taiwanese longline fisheries during 1997-2007. DWLL stands for catches by the distant-water longline fishery, OSLL for the offshore longline fishery.

Unit: mt

Year	Albacore			Bluefintuna			Swordfish			Striped marlin		
	DWLL	OSLL		DWLL	OSLL		DWLL	OSLL		DWLL	OSLL	
		domestic-based	foreign-based		domestic-based	foreign-based		domestic-based	foreign-based		domestic-based	foreign-based
1997	9,119	337	-	-	1,814	-	15	1,358	-	59	290	-
1998	8,617	193	-	-	1,910	-	20	1,178	-	90	205	-
1999	8,186	207	-	-	3,089	-	70	1,385	-	66	128	-
2000	7,898	802	-	-	2,780	-	325	1,531	-	153	161	-
2001	7,852	747	-	-	1,839	-	1,039	1,691	-	121	129	-
2002	7,055	910	-	-	1,523	-	1,633	1,557	-	251	226	-
2003	6,454	712	-	-	1,863	-	1,084	2,196	1,491	241	91	590
2004	4,061	927	-	-	1,714	-	884	1,828	1,536	261	95	166
2005	3,990	477	5	-	1,368	-	392	1,813	1,759	199	76	508
2006	3,848	453	16	1	1,148	-	438	2,587	1,357	204	87	450
*2007	2,465	321	130	-	1,401	-	345	2,907	847	102	133	66

Year	BUM			BLM			SFA		
	DWLL	OSLL		DWLL	OSLL		DWLL	OSLL	
		domestic-based	foreign-based		domestic-based	foreign-based		domestic-based	foreign-based
1997	20	3,625	-	1	611	-	13	527	-
1998	21	3,603	-	5	469	-	34	868	-
1999	53	3,362	-	8	563	-	5	402	-
2000	75	4,056	-	19	453	-	49	499	-
2001	209	4,524	-	4	428	-	4	640	-
2002	138	4,310	-	5	173	-	1	504	-
2003	218	4,289	3,178	4	305	805	7	380	1,699
2004	372	3,354	2,946	2	620	886	11	514	1,567
2005	376	3,949	3,305	15	636	508	63	709	624
2006	363	3,842	1,524	5	275	686	11	425	63
*2007	275	3,230	1,612	1	215	44	2	527	532

* Data of 2007 is still preliminary

** The catch of domestic-based OSLL fishery does not include the landing in frozen form

*** The catch of foreign-based OSLL is preliminary estimations

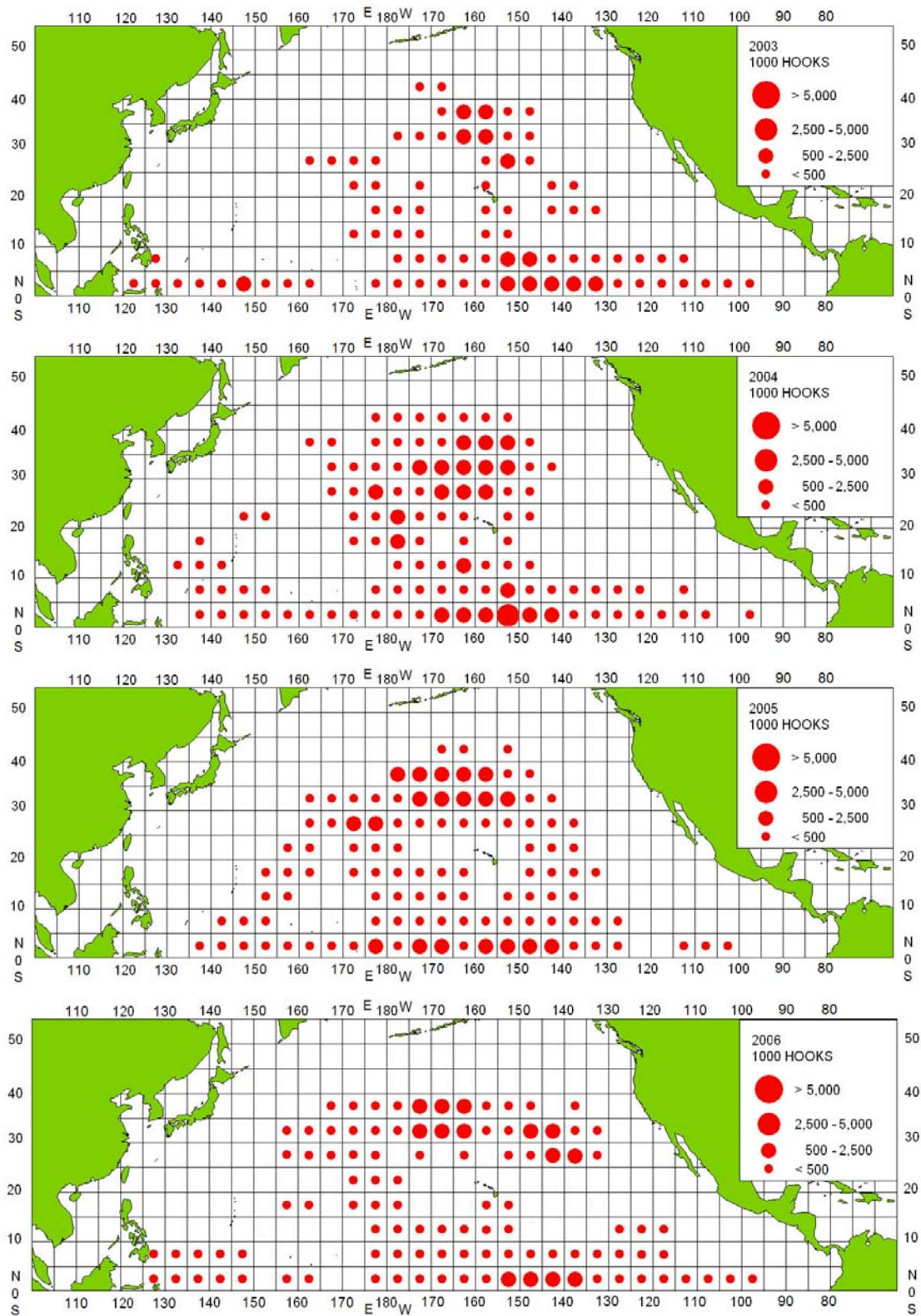


Figure 1. The effort distribution of the distant water longline fishery operated in the North Pacific region during 2003-2006.(Note: Map of 2006 is still preliminary and will be revised shortly.)

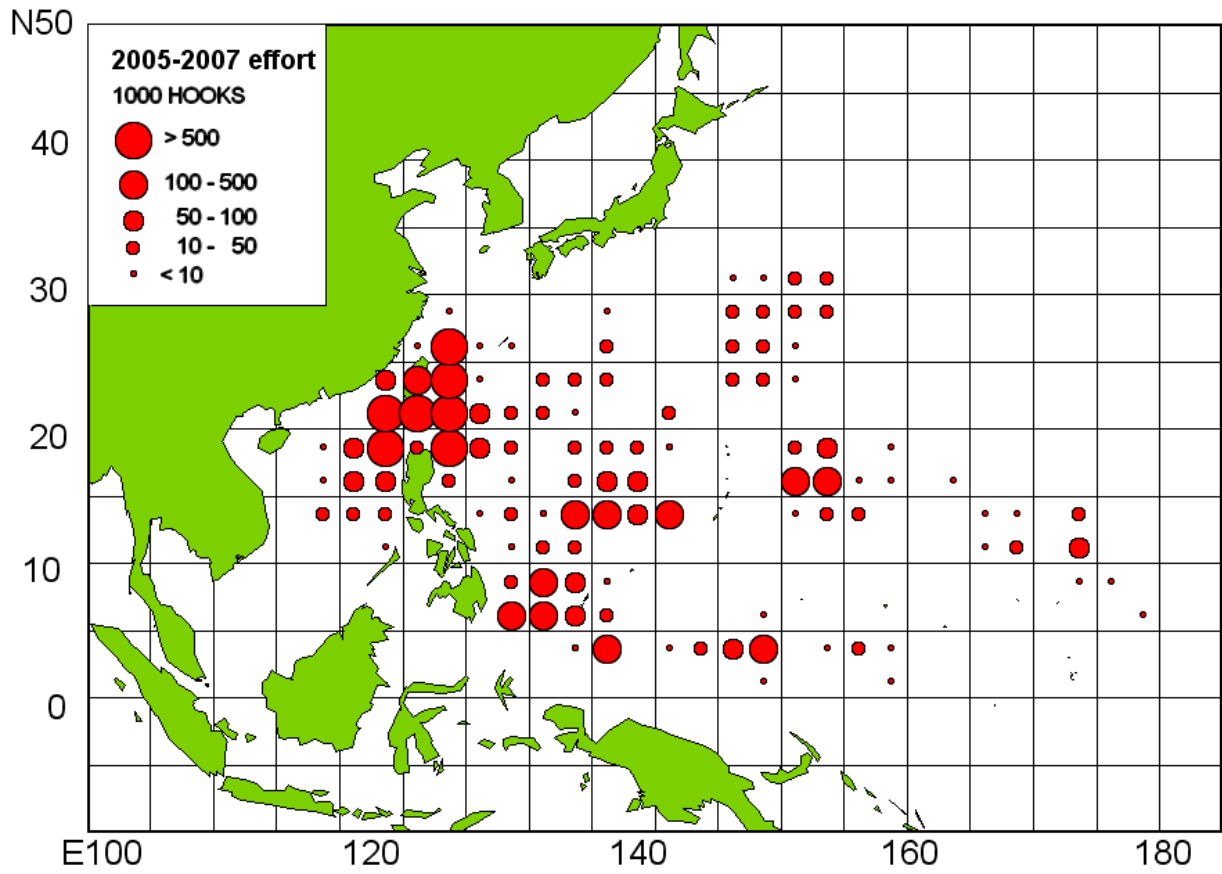


Figure 2. Effort distribution of Taiwanese domestic-based offshore longline fishery for 2005-2007. (Note: the data from logbook and the coverage rate is less than 5%)

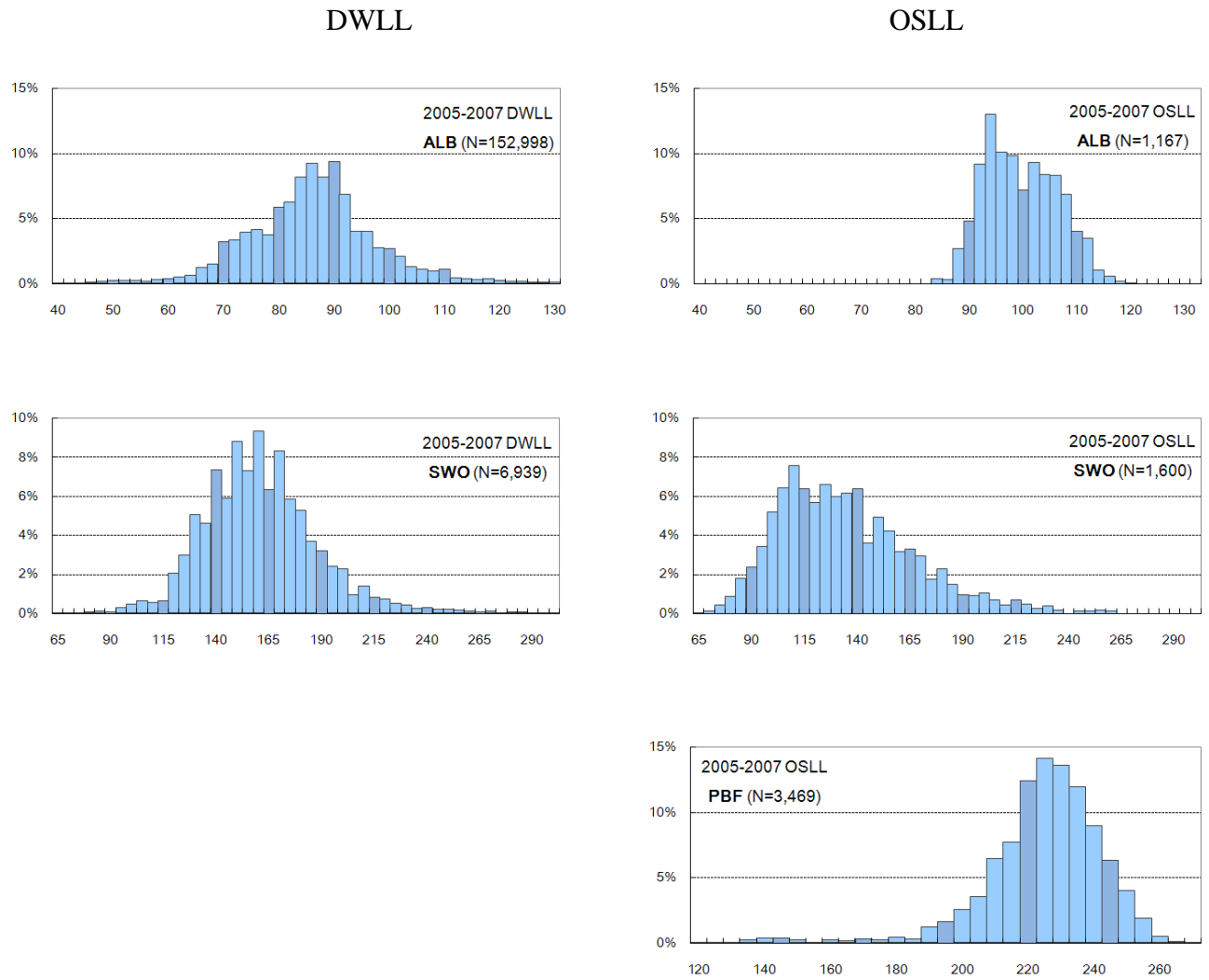


Figure 3. Length frequencies of albacore, swordfish and bluefin tuna by the distant water longline (DWLL) and offshore longline (OSLL) fisheries in the North Pacific Ocean during 2005-2007. The length scales vary for different species.