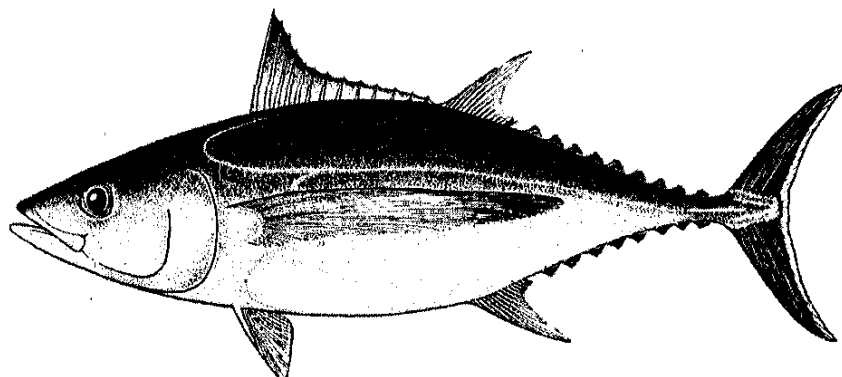




SCTB16 Working Paper

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Update on Tuna Fisheries of Taiwan in the Pacific Region



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INTRODUCTION

The Pacific Ocean is one of the earliest fishing grounds exploited by Taiwanese tuna fishery. Currently, there are three types of tuna fisheries operating in this region: the frozen tuna longline (FTLL) fishery, the distant-water purse seine (DWPS) fishery and the fresh and/or chilled tuna longline (CTLL) fishery based upon how the catches were stored (chilled or frozen), or gear types and the vessel sizes.

THE FROZEN TUNA LONGLINE (FTLL) FISHERY

The FTLL vessels refer to those vessels mostly greater than 100 GRT and operating in distant waters of foreign EEZ and high seas. Number of FTLL vessel in the entire Pacific Ocean in 2002 was estimated as 133, a significant increase from the previous year (101). Historically, most of these fleets targeted on albacore for canning, but in recent years, a higher proportion targeted on tropical species for Japanese frozen sashimi market.

The major fishing grounds of FTLL fleet was located in the central and south regions (Figure 1). Due to a good catch of northern albacore, the northern region has become more and more important in some seasons.

Table 1 shows the catch estimate of major tuna and tuna-like species caught by FTLL fishery in recent five years (1998-2002). During 1998-2000 period, the most dominant species was albacore, accounting for about 79% of the total catch (Figure 2) and tropical species (bigeye and yellowfin tunas) for another 15%. But albacore, yellowfin and bigeye tunas became the major species, accounting for 38%, 34% and 17%, respectively, during 2001-2002. The average catch in recent five years was about 18,500 mt for albacore, 7,000 mt for bigeye, and 4,000 mt for yellowfin tuna. In 2002, the catch of albacore was 18,270 mt, an increase of 2,046 mt from 2001.

THE DISTANT WATER PURSE SEINE FISHERY

Purse seine fishery was introduced into Taiwan in 1982 and has become one of the major fleets. Total number of purse seine vessel in 2002 is 41, the same as the previous year, of which 18 are greater than 1,000 GRT and 23 between 500 and 1,000 GRT.

Total catch and major species caught in this fishery during 1998-2002 period were shown in Table 2. The most dominant species remained to be skipjack, accounting for about 81% of the total catch (Figure 3). Yellowfin tuna was the 2nd dominant species accounting for another 18%, and the bigeye tuna only accounted for 1% of the total catch. Average catch during this period was about 192,000 mt for skipjack, 45,000 mt for yellowfin and 2,000 mt for bigeye tuna. For 2002, catch of yellowfin was 19,785 mt, decreased by about 43%, but catch of skipjack and bigeye tunas was 46,884 mt and 359 mt, increased only by about 26% and 16%, respectively. Such a change may be related to the change of major fishing grounds.

The major fishing grounds of DWPS fishery varied significantly in this period (Figure 4). The fishing grounds in 2001 essentially located only in areas west of 180°E. However, in 2002, fishing grounds extended to as far as 151°W due possibly to the impact of El Niño. After 2001, fishing grounds started to move westward and mainly located in the western and

central part of the tropical Pacific Ocean (135-180°E, 8°N-8°S) with sporadic efforts concentrated in areas east of 180°E.

Figure 5 shows the comparisons of CPUE (mt/set) and total catch among fishing areas. The CPUE, in general, fluctuated between 20 and 45 mt/set among fishing areas from 1997 to 2002. The major catches were in PNG, high seas, FSM and Kiribati. The catch in these areas accounts for about 83% of the total catch. There seems no consistent pattern between CPUE and regional catch by years. In 2001, the highest CPUE was found in PNG waters and the lowest in Tuvalu while the highest catch was located in Kiribati waters and the lowest in Tuvalu region. In 2002, the highest CPUE was found in Solomon Islands and the lowest in Marshall Islands while the highest catch was located in Kiribati waters and the lowest in Marshall Islands.

In terms of "school types", most of the catches in DWPS fishery were from "free" and "associated" schools (Figure 6(A)). This pattern is consistent for all years between 1997 and 2002. The average CPUE for these two types were between 26 and 52 mt/set (Figure 6(B)). Although, the highest CPUE was in "feeding school" for most years (except 2002), however, due to this type of school was difficult to find, the catch percentage of this school was small comparatively.

THE FRESH/CHILLED TUNA LONGLINE FISHERY

The CTLL vessels operated both in the coastal and offshore waters of Taiwan and in general, smaller than 100 GRT. However, in recent decades, some of them have expanded their fishing ground to distant waters and operating in a similar pattern as FTLL vessels. This makes it difficult to classify the scale of this fishery. In addition, they may change their fishing ground and target species bases on fishing season or market price. Thus monitoring of their fishing activities became very difficulty.

Number of registered CTLL vessels (<100 GRT) was estimated as about 1,700 in recent five years (1998-2002), included vessels operated in both the Pacific and the Indian Oceans. They might land their catch in Taiwan or in foreign bases. Considering the geographical location of Taiwan, catches landed in Taiwan are believed to be mostly from the Pacific region including surrounding waters of Taiwan, although a small proportion may actually come from the Indian Ocean. Total catch of tuna and tuna-like species landed in Taiwan by this fleet was stable in five recent years (1998-2002) and averaged at about 45,000 mt (Table 3). The dominant species caught included yellowfin tuna (22%), swordfish (6%) and billfish (33%) (Figure 7).

As to those landed in foreign bases, we acquired information on the fishing activities of our vessels in the base from relating trading companies and used this information to estimate the amount of catch from available commercial data. The bigeye and yellowfin catch estimates from the bases in the Pacific Ocean in 2002 were 5,754 mt and 7,895 mt, respectively.

MARKET DESTINATION OF CATCHES

Most of the albacore catches from FTLL vessels were landed at American Samoa and Fiji

or transshipped to Thailand for canning, while the tropical tunas catches sent to Japan for sashimi market. Catches of DWPS fishery were mostly transshipped to Thailand for canning, only a small proportion was sold to Japan for Katsubushi and sashimi. Fishes caught by CTLL vessels, however, were mostly sold in the local market or transshipped to Japan for fresh sashimi market.

THE VESSEL MONITORING SYSTEM

The experimental vessel monitoring system (VMS) was implemented continuously from previous years for the purpose of better management of our distant water fishing vessels. The government has encouraged FTLL vessels to install the VMS through an incentive program from July 1996 through June 2000. Essentially all purse seine vessels operating in the Pacific Ocean have installed such a system. Installation of the system and reporting vessel position through it is not compulsory at present. Nevertheless, the government recognizes that as a major fishing nation, it is our obligation to play a leading role in the region not only to be in line with the international trend on management of fishery resources, but also to achieve the goal of the sustainable use of these resources. It is our goal that all distant water vessels operating in the region will eventually be equipped with such a system.

THE OBSERVER PROGRAM

For purposes of better understanding the fishing activities and the bycatch issue of the longline fishery and to be in line with the international requirement for conserving marine resources, the government has launched an experimental observer program since 2001. In 2002 and 2003, there are 6 observers each year dispatched to the three major Oceans. Data obtained will be reviewed and used for scientific purposes in the near future.

THE MANAGEMENT EFFORTS IMPLEMENTED BY GOVERNMENT

In order to be in accordance with the international trend on management of marine resources, our government has initiated some programs on management and conservation of some important marine species, such as green turtle (*Chelonia mydas*) and whale shark (*Rhincodon typus*). The satellite telemetry technique has been introduced to study the migration patterns of green turtle. Also, a sanctuary area for green turtle was established in Pen-Hu Island (southwest of Taiwan) to protect their spawning and nursery ground.

In May of 2002, a shark conference was held in Taiwan to discuss the conservation and utilization of the resources in the Ocean. For the whale shark, the government has set up a system to collect catch, fishing location, weight and length information. The government has also set a total allowable catch (TAC) of 80 fish per year since July 1 of 2002, and 120 fish for July 2003 to December 2004.

Two whale sharks have been tagged successfully on April 2002 to study their migration behavior. Current information indicated that whale shark migrate between south eastern Taiwan and Philippines, and mostly stayed in water columns where temperature were between 24°C and 28°C. The tagging project will be proceeded continually, and might be in joint work with APEC members, to study its migration and biology.

Table 1. Catch (in mt, round weight) statistics of major tuna and tuna-like species caught in frozen tuna longline fishery in the Pacific region during 1998-2002 period.

Year\Species	ALB	BET	YFT	SWO	BILL	SKJ	TOTAL
1998	18,416	1,395	904	228	585	499	22,027
1999	18,245	1,993	1,181	315	503	779	23,016
2000	20,981	2,876	2,105	362	1,415	274	28,013
2001	16,224	8,070	4,814	2,237	901	311	32,557
2002*	18,270	21,783	9,869	3,742	1,445	151	55,260

* a preliminary estimate

Table 2. Catch (in mt, round weight) statistics of major tuna species caught in distant water purse seine fishery in the Pacific region during 1998-2002 period.

Species\Year	1998	1999	2000	2001	2002*
SKJ	193,728	160,453	194,499	182,531	229,415
YFT	64,764	41,905	38,579	45,853	26,068
BET	201	3,372	1,900	2,284	2,643
Total	258,693	205,730	234,978	230,668	258,126

* a preliminary estimate

Table 3. Catch (in mt, round weight) of tuna and tuna-like species in the fresh/chilled tuna longline fishery landed in domestic ports of Taiwan (including vessels operated in distant waters) during 1998-2002 period.

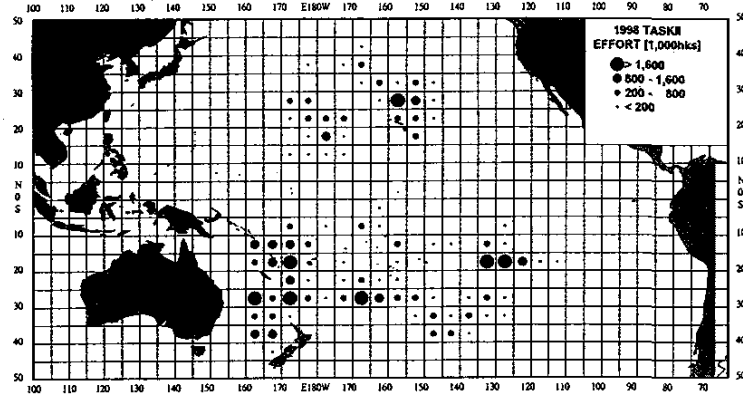
Year\Species	ALB	BET	YFT	SWO	BILL	OTH	Total
1998	613	3,669	9,456	2,450	16,524	13,674	46,385
1999	382	2,673	10,347	2,720	14,486	17,018	47,626
2000	944	2,092	8,376	3,147	16,456	15,372	46,387
2001	832	3,292	12,741	3,694	15,892	9,636	46,087
2002*	910	2,150	9,145	2,511	10,732	14,193	39,641

OTH: other species.

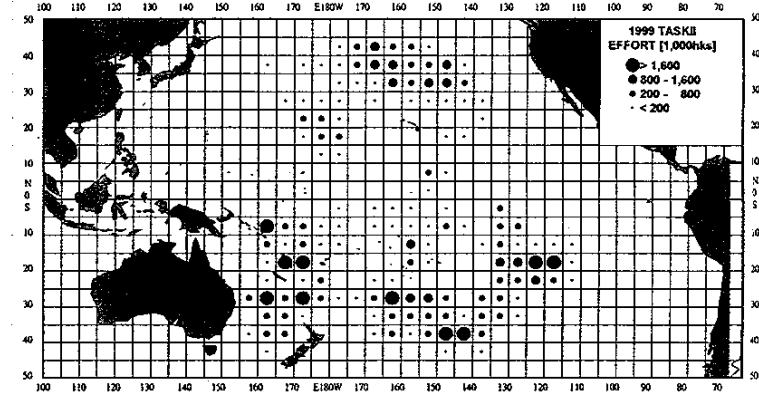
* a preliminary estimate

1998-2001 TASKII Effort Distribution [1,000hks]

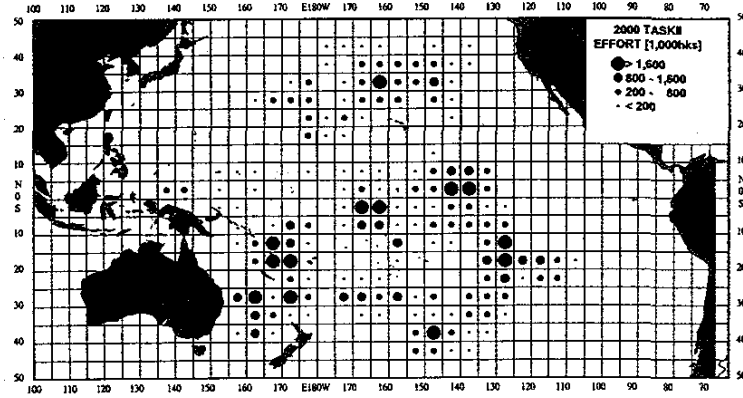
1998



1999



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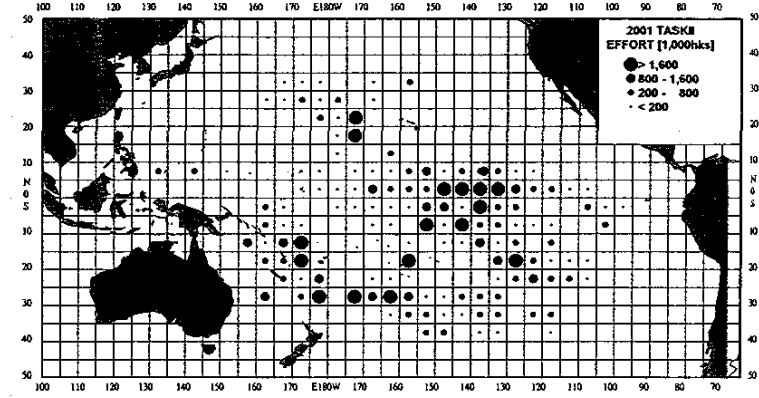


Figure 1. Effort distribution of Taiwanese frozen tuna longline fleet operating in the Pacific Ocean during 1998-2001 period.

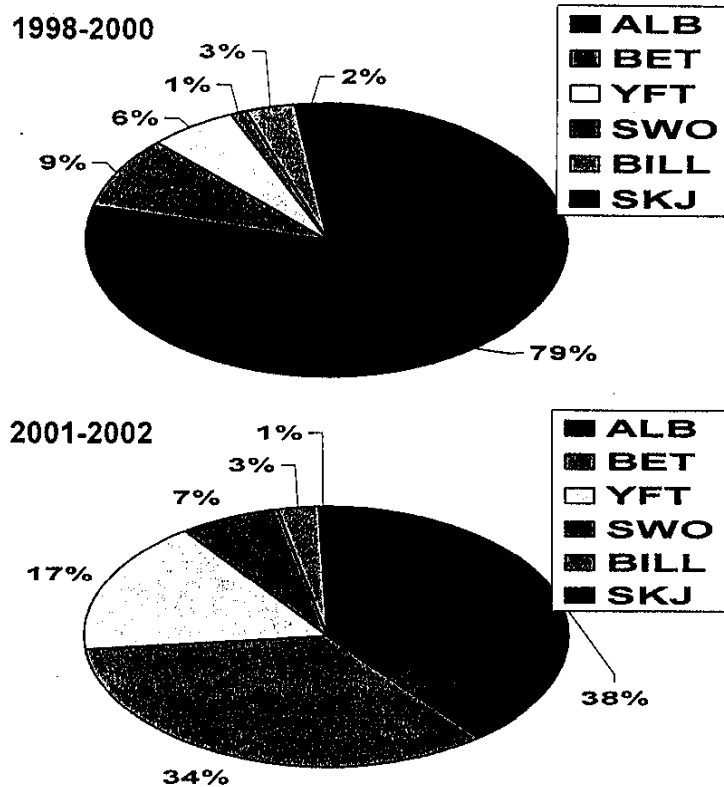


Figure 2. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese frozen tuna longline fishery in the Pacific region during 1998-2000 and 2001-2002 period, respectively.

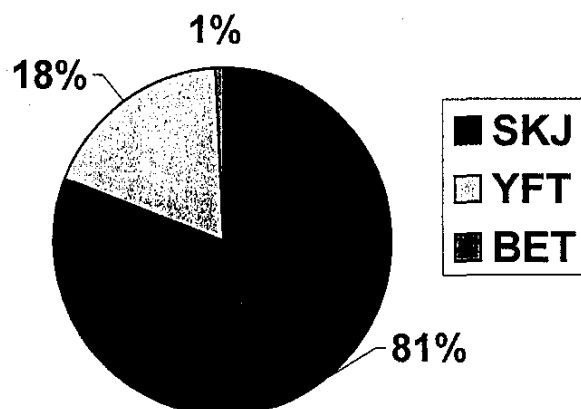
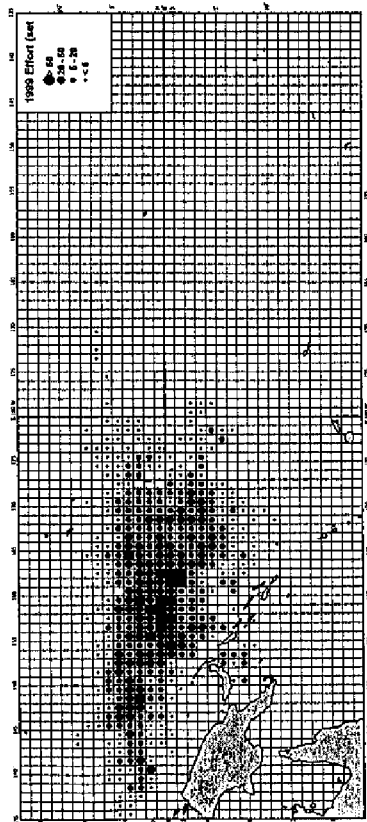
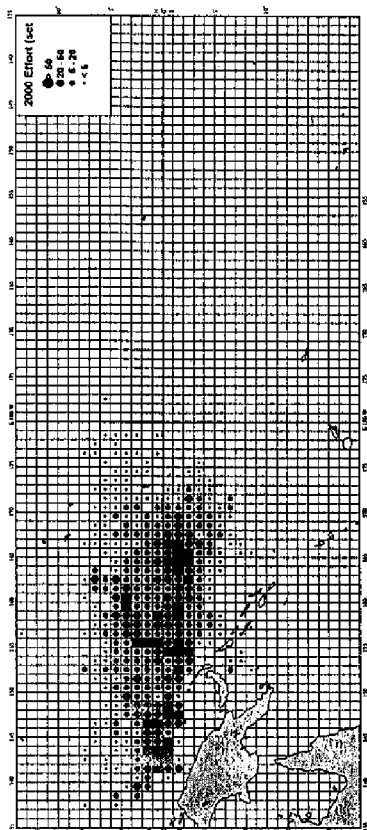


Figure 3. Mean catch percentage of major tuna and tuna-like species caught by Taiwan distant water purse seine fishery in the Pacific region during 1998-2002 period.

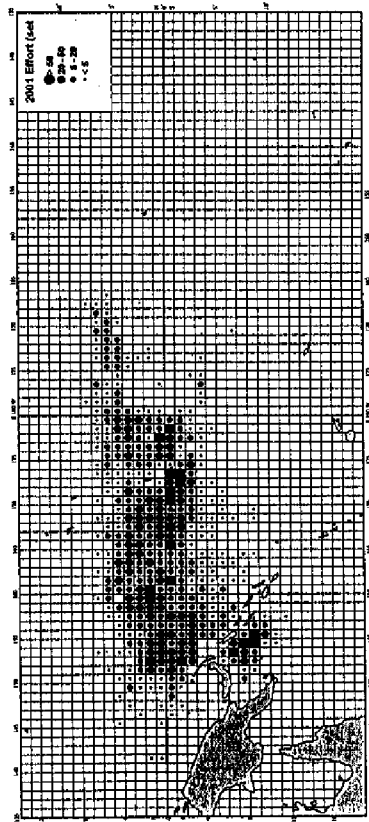
1999



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2002

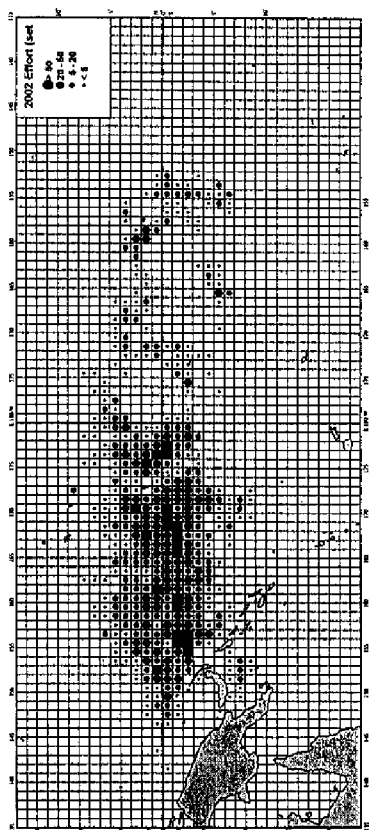


Figure 4. Effort distribution of Taiwanese distant water purse seine fleet operating in the Pacific Ocean during 1999-2002 period.

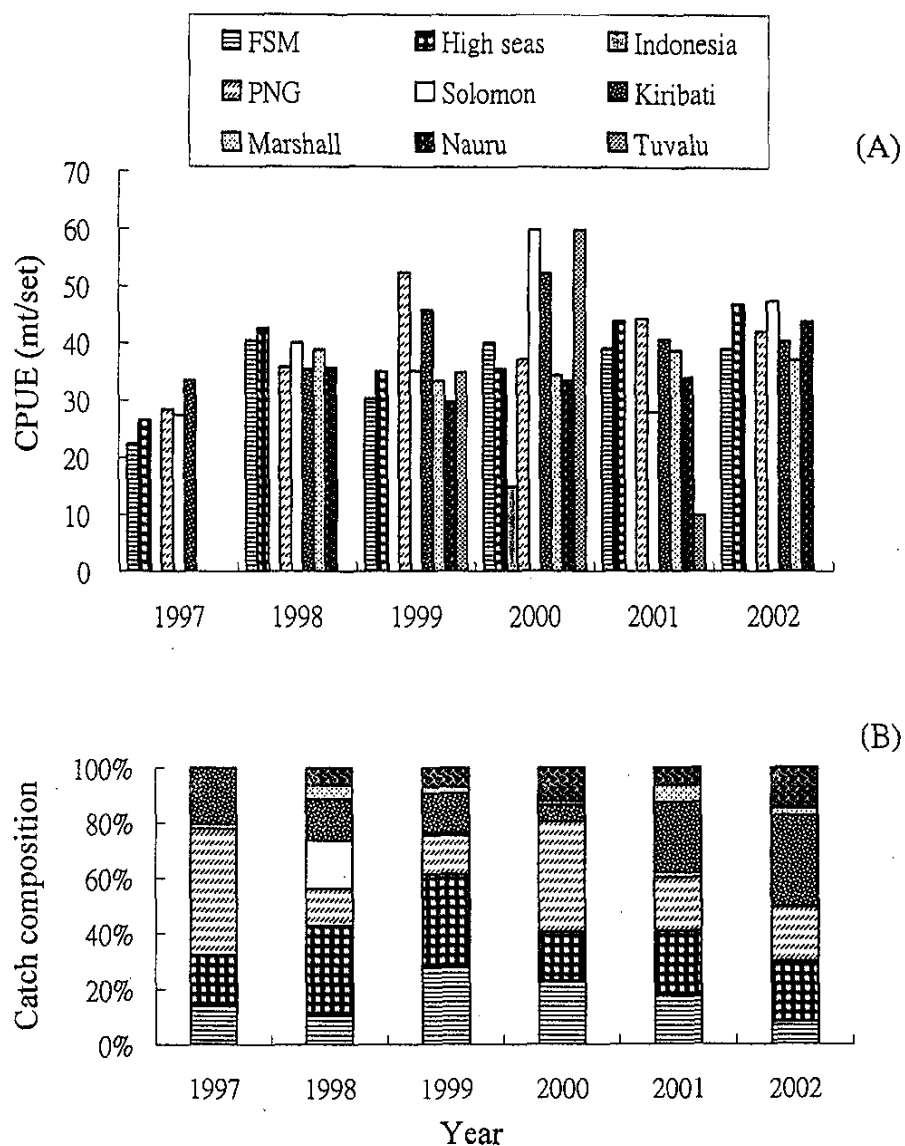


Figure 5. Comparison of (A) CPUE (mt/set) and (B) catch composition among fishing areas in Taiwanese distant water purse seine fishery operating in the Pacific region during 1997-2002 period. (1) Federated States of Micronesia (FSM); (2) High seas; (3) Indonesia; (4) Papua New Guinea (PNG); (5) Solomon Islands; (6) Kiribati; (7) Marshall Islands; (8) Nauru; (9) Tuvalu

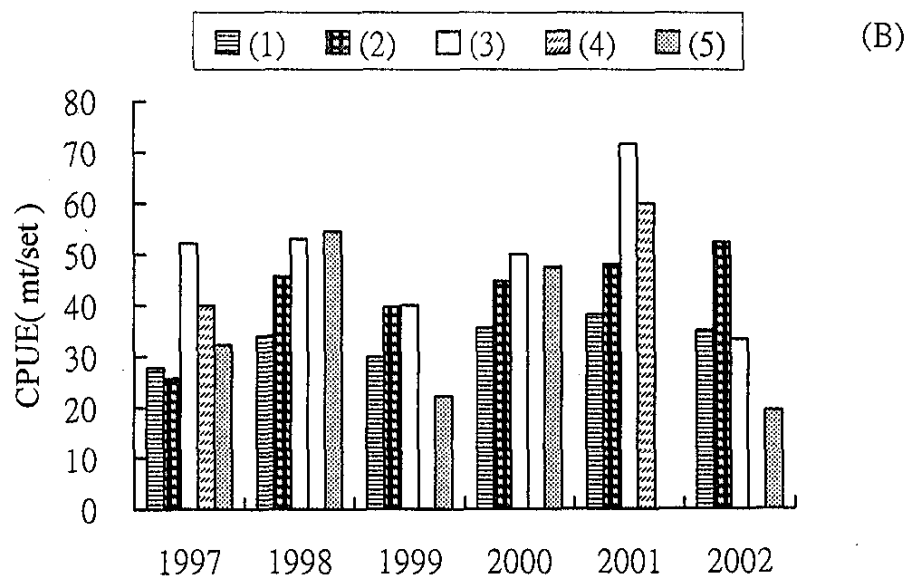
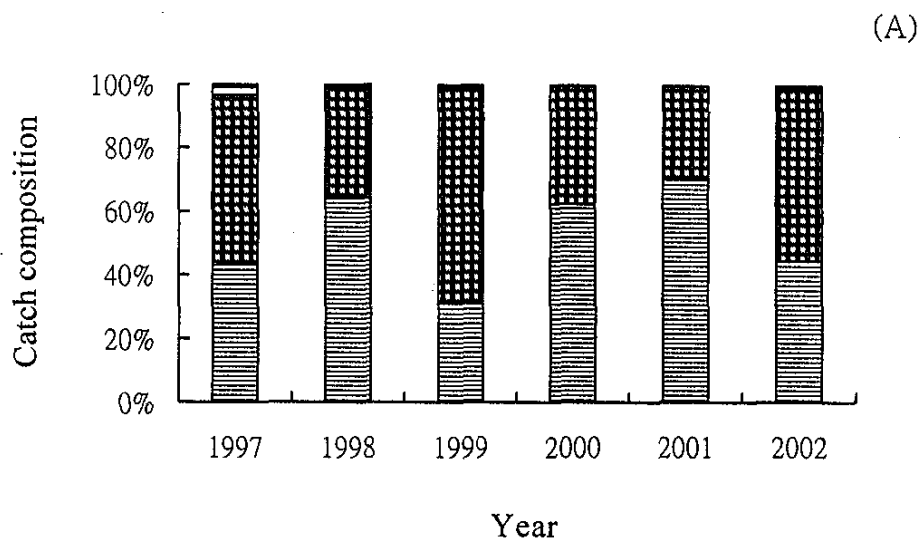


Figure 6. Comparison of (A) catch composition and (B) CPUE (mt/set) by school in Taiwanese distant water purse seine fishery operating in the Pacific region during 2002 period. (1) free school; (2) associated school (including FADs); (3) feeding c fish school; (4) life-whale-shark school; (5) others (unspecified).

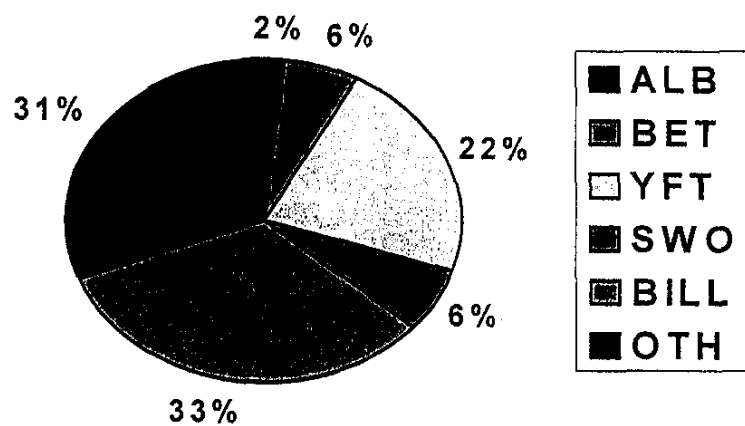


Figure 7. Mean catch composition of major tuna and tuna-like species caught by Taiwanese fresh/chilled tuna longline fishery during 1998-2002 period.