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## Activities and data collection of Pacific Bluefin tuna by Taiwanese fishery

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## 1. Activity of fisheries

Pacific bluefin tuna (*Thunnus orientalis*) was apparently targeted from 1993 by Taiwanese small scale longline fleet, nonetheless, fishery data collection from all tangible fisheries was made available to date back to early 1960s. During late 1980s, there were small amount of Pacific bluefin tuna harvested, other than small scale longline, by purse seine, large scale pelagic driftnet, set net, offshore and costal gill net and bottom longline, etc. Annual landings were less than 700 mt (Fig. 1) before 1993, and an abrupt increasing landings after 1993 onward mainly taken by small scale longline fleet (<100 GRT) to target the spawner when they migrate to spawning ground in the eastern waters off Taiwan.

Longline and vessels less than 24 m LOA (<100 GRT) is used to target Pacific Bluefin tuna seasonally to make free with which tunas and tuna-like species are apparently near waters off coast and offshore. Those vessels are categorized mainly 3 classes, i.e. class I: 10-20 GRT; class II: 20-50 GRT; and class III: >50 GRT and <100 GRT. Those vessels are based at Tungkang, Suao and Hsinkang. Hsinkang is a fishing port located at the southeastern Taiwan, where mainly the swordfish, billfishes, dolphin fish and migrating species other than tunas were disembarked. Suao fishing port located at the northeastern Taiwan and is an important fishing port for mackerel, sharks, corals and squids. And Tungkang is the second largest fishing ports for migrating species, following Kaohsiung Chien-Chen fishing port. The number of fishing vessels targeting pacific Bluefin tunahave been regulated by Fishery Agency since 2010, which the yearly fishing liscense must renewed in accordance with the compliance of fishery management in previous year. Figure 2 indicates the number of vessels had registered to fish Pacific Bluefin tuna from 2001 to 2010. The number of fishing vessels reached highest 684 in 2002 and decreased steadily to 351 in 2010.

Regarding the fishing gear configuration, bait use and days per trip, fishermen change the hook size to 4 sun and use the monofilament mainline of 2.45 mm in diameter, monofilament branchline of 2.1 mm in diameter. The number of hooks per set deployed are from 800 to 1,200 (Fig.3) with 3-5 hooks between floats (Fig.4), and the length of float line/ branchline is about 28 to 30 meters. Fishermen prefer using *Illex*, live milkfish and mackerel as baits some will use razor trevally (*Mene maculata*) as fishing bait. The days of a fishing trip are usually less than 2 weeks, i.e. 4- 14 days in according to whether or not a Pacific Bluefin tuna is caught (Fig.5).

Some fishing vessels operated seasonally targeting bluefin tuna from April to July to the

domestic unloading data, the Pacific bluefin tuna fishing season of small scale longline fishery starts in April, reaches the highest in May and ends in July with few catch after July (Fig.6) in the most recent years. The fishing locations in high season, May and June, shows in Fig.7. Most of the PBF were caught in the eastern waters of Taiwan with some in Palau waters.

To fetch higher price at auction market, the PBF catches are processed into gutted form at sea. Regarding the PBF trading, most of the catch consumed domestically. From the Customs exporting data (Fig.7), Japan was the major exporting destination of Taiwan PBF catch with highest, 150mt, in 2003.

## 2. Fishery data collection

The Oversea Fisheries Development Council (OFDC) is in charge of Pacific bluefin data collection from 2003 for the landings and from 2007 for catch, effort and biological samples. Those activities were pursued by OFDC under various research schemes.

### a. Logbook

The logbook system for small scale longline fisheries distributed to fishing boats incepted in 2007, and the coverage of logbooks return from fishing boats was very low before 2011, in particular, for Pacific bluefin tuna fishery. Besides, there are no official logbooks distributed for other offshore and coastal fisheries. However, there has been planning a scientific research scheme for collecting the fishery catches and effort from any kinds of coastal and offshore vessels.

### b. Loading data

Almost all catches and by-catches of STLL fishery have generally been auctioned in the fishing markets, Pacific Bluefin tuna catch always disembarked at Tungkang, Suao and Hsinkang fishing markets in according to the time consumed to and from fishing grounds. Pacific bluefin tuna auctioned have been recorded in detailed information of weight and price by the associations. OFDC is in charge to collect the complete auction data from the major fishermen associations since 2001, and these data is the basis for Pacific bluefin tuna catch estimation.

Regarding to other 1 fisheries with Pacific bluefin tuna bycatch, there is another data collection system running by Fishery Agency. For example, daily catch report is required for all fishing companies running set net fishery through internet data reporting system.

c. Biological data

The sampling program in the domestic port launched in 1997 to collect the length data of tuna, yellowfin tuna and bigeye tuna only, harvested by small scale longline fishery. Since 2002, Pacific Bluefin tuna length data collection had been included into the sampling program. In 2010, Fishery Agency implemented the Pacific Bluefin tuna CDS regulation and all PBF catch unloaded in domestic ports had been required attached with the length data.

To complement the samples needed for age-length key research, otolith collection was included into the sampling program in 2011.

3. Management

As an one of the main fishery nations targeting for the Pacific bluefin tuna and a responsible fishing nation, Taiwan has made the entry limit for fishing vessels and revised our domestic regulation in March, 2010 to further set the number of vessels fishing for north Pacific bluefin tuna to 660 at most. In 2011, 585 vessels in total have been authorized by this Agency to fish for this species. Catch Documentation Scheme was introduced in 2010. When Pacific bluefin tuna is caught at sea, it shall be tied with tag and such catch information shall be reported by the captain to fishery radio stations. In addition, the captain shall submit relevant documents regarding CDS before landing.

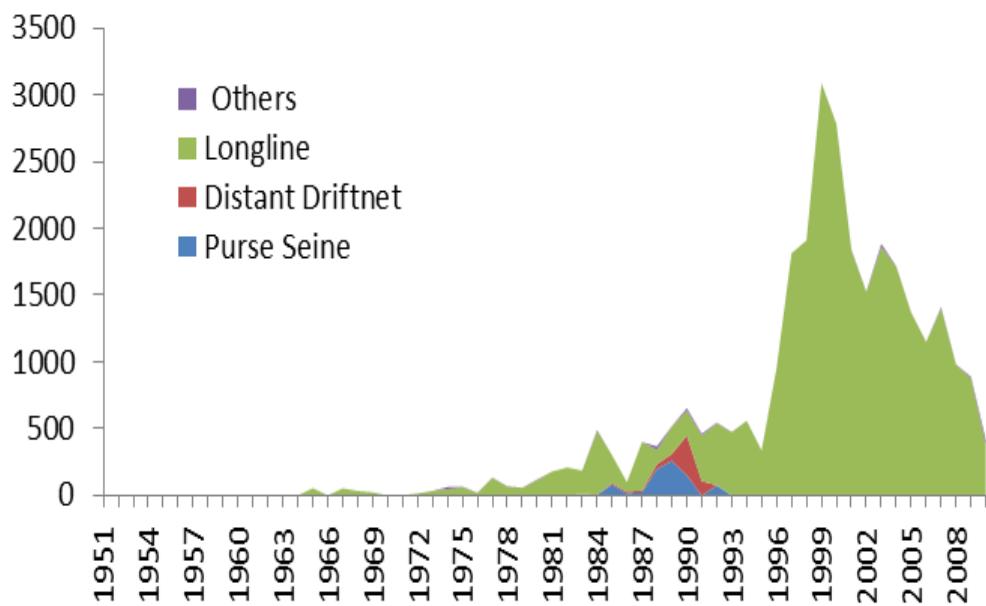


Fig. 1 Historical Pacific Bluefin tuna catch of Taiwanese fisheries.

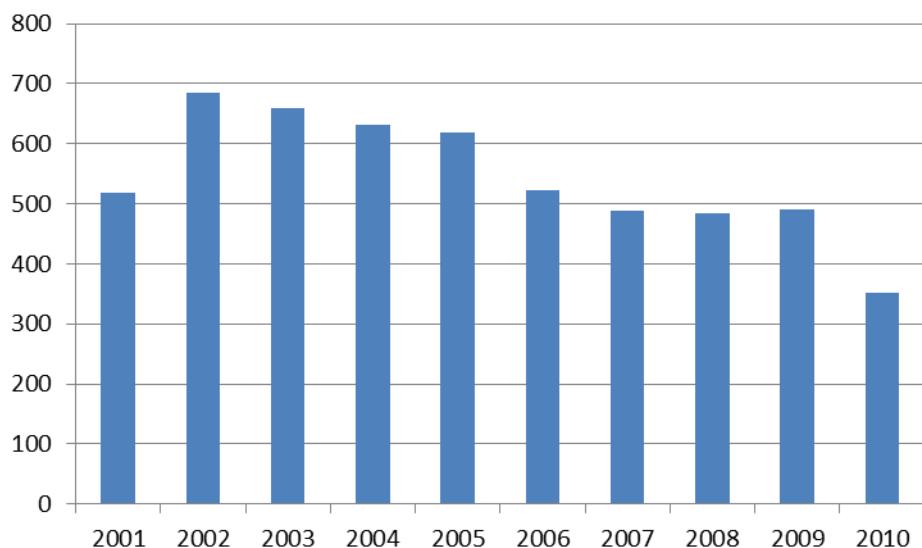


Fig. 2 The number of fishing vessels for PBF from 2001 to 2010

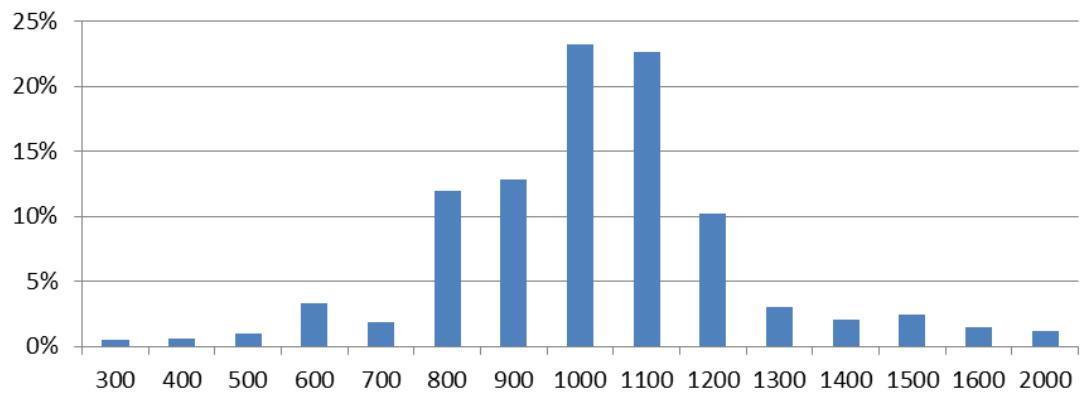


Fig. 3 The distribution of daily hooks deployed by Taiwan small scale longline fleet for PBF

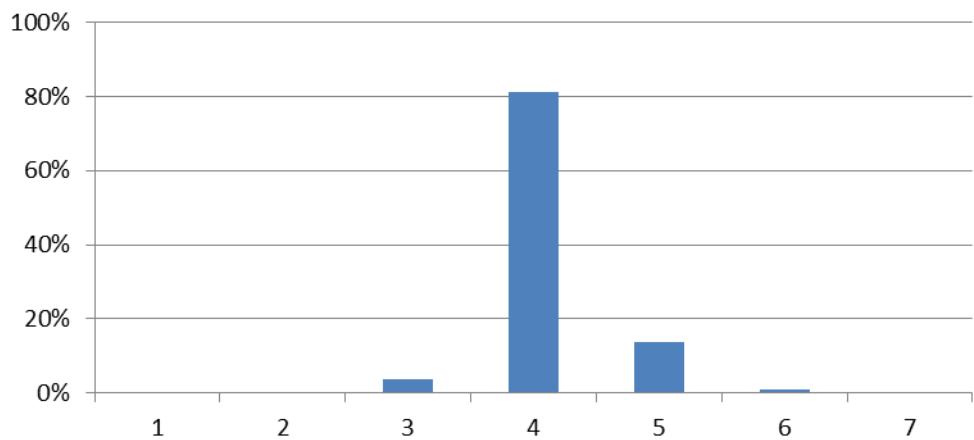


Fig. 4 The frequency distribution of hooks between floats deployed by Taiwanese small scale longline fleet for PBF

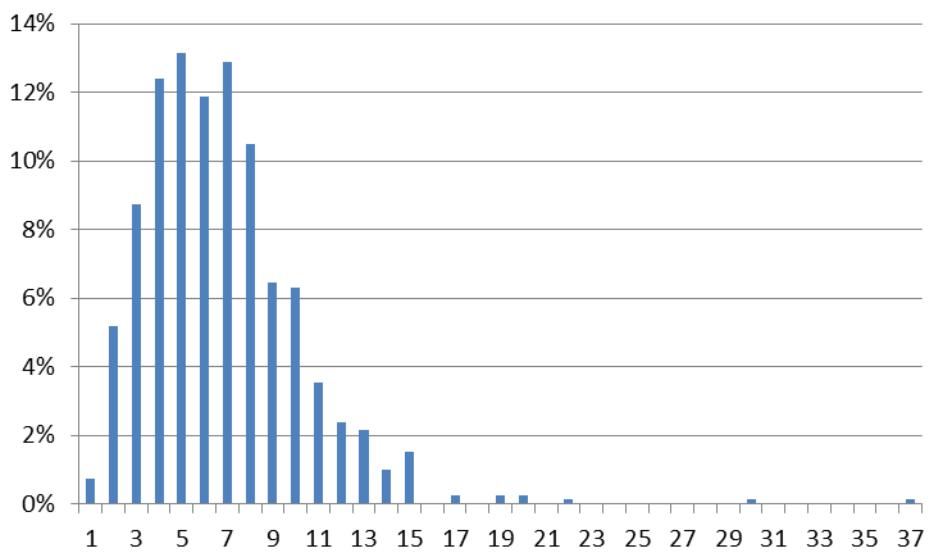


Fig. 5 The frequency distribution of days at sea of Taiwanese small scale longline fleet  
for PBF  
Unit: kg

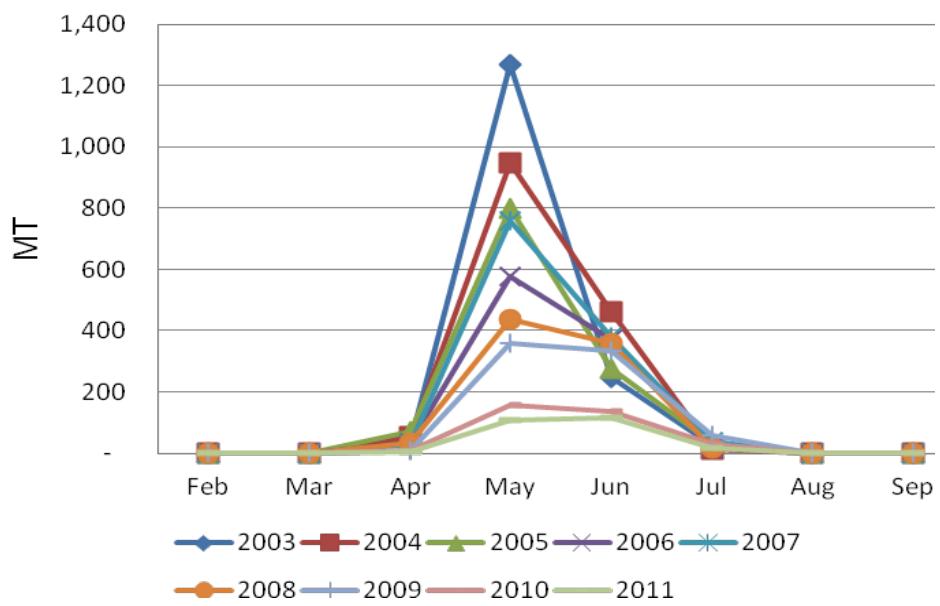


Fig. 6 Historical Pacific bluefin tuna catch of Taiwanese small scale longline fleet by month.

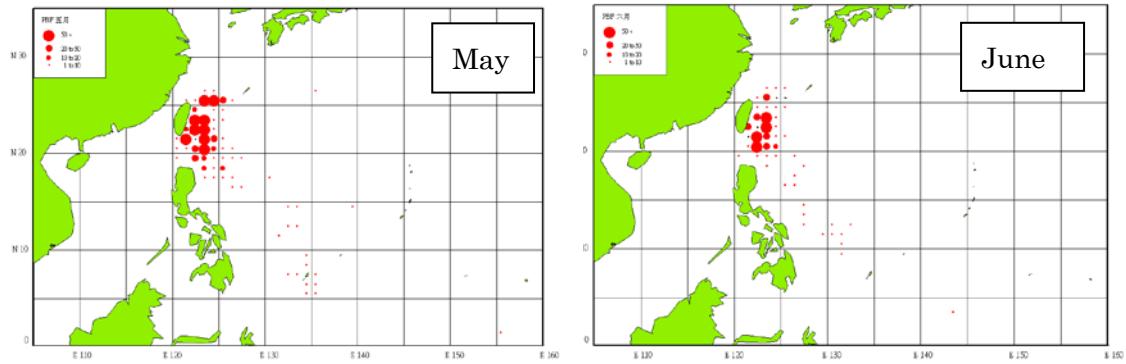


Fig. 8 Location distributions of PBF catch in high season

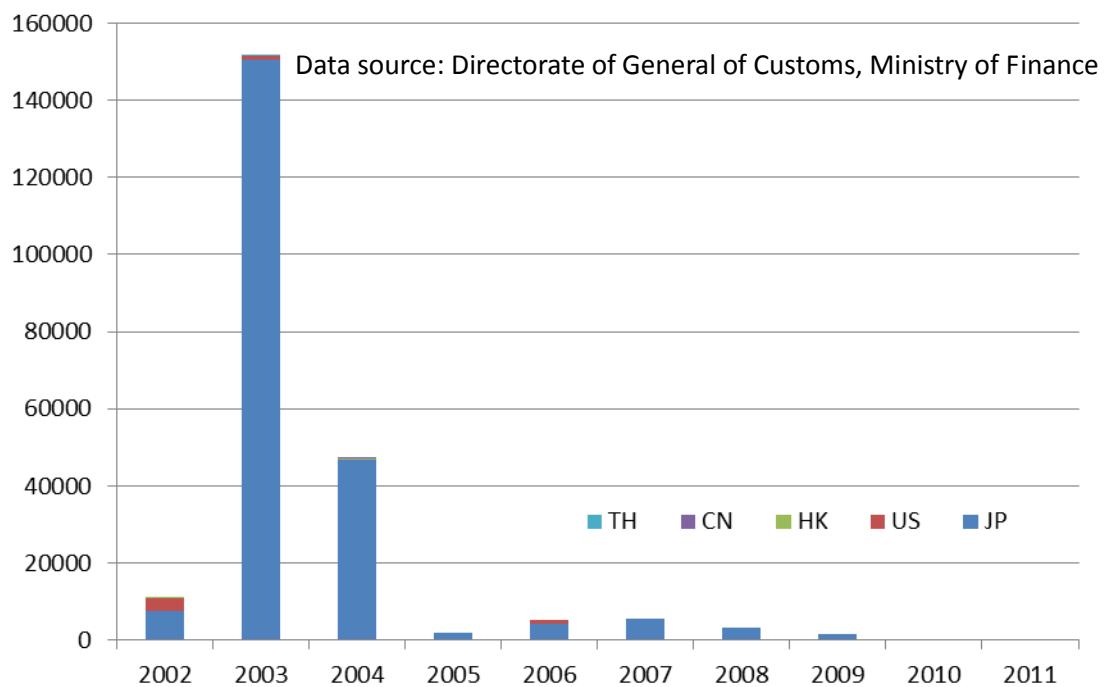


Fig. 8 The weight of PBF exporting from 2002 to 2011