

Catch estimates of swordfish (*Xiphias gladius*) for the WCNPO and EPO stocks from the Taiwanese fisheries*

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Introduction

A two-stock scenario was proposed by Ichinokawa and Brodziak (2008), which assumed a western central North Pacific (WCNPO) and an eastern tropical Pacific (EPO) stocks in the North Pacific Ocean. This assumption was supported by genetic studies and the analyses of Japanese longline CPUE which showed a boundary in the southeast Pacific, and was considered to be the best hypothesis for swordfish stock assessment and management in the North Pacific Ocean. This study aimed to estimate swordfish catch from various Taiwanese fisheries for the WCNPO and EPO stocks using available information collected from fisheries.

Materials and methods

Nominal catch data of swordfish by fishery in the Pacific Ocean were obtained from the Oversea Fisheries Development Council (OFDC) of Taiwan. For the distant-water longline fishery, we separated the swordfish catch into the WCNPO and EPO stocks according to the logbook information. However, we separated swordfish catch from the offshore longline fishery into the two stocks based on monthly catch reports from captains and vessel monitoring system (VMS) because the coverage rate of logbooks was low although getting improved in recent years.

Due to the availability of sufficient reported information, swordfish landings in foreign ports for the offshore longline fishery have been estimated annually since 2000 for the WCNPO stock (Table 1). However, this kind of data is not available for the offshore longline fishery in the EPO. Catches of swordfish from the offshore and coastal fisheries such as harpoons and gillnets were assigned to the WCNPO stock because these fleets only operated in waters off Taiwan.

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Results and discussion

The catch table of swordfish by stock and by fishery was shown in Table 2. For the WCNPO stock, catches of swordfish from the distant-water longline fishery were low compared to those from the domestic-based offshore longline fishery that showed a continuously increasing trend since the late 1990s. Landings of swordfish in foreign ports were high in the early 2000s, but decreased gradually in recent years after 2007 until 2012. In contrast, only a small amount of swordfish catch was reported for the offshore and coastal gillnet, set-net, harpoon, and all other fisheries in the WCNPO.

Catches of swordfish reported for the EPO stock were higher compared to the WCNPO stock before the year of 2000, and increased substantially to more than 3000 metric tons in the early 2000s probably because of the high fishing effort employed and the changes in targeting and fishing ground during this period (Sun et al., 2014), but gradually reduced to less than 1000 mt in recent years. A small amount of swordfish catch from the offshore longline fishery in the EPO was estimated from the years after 2003. However, a swordfish catch of 694 mt for this fishery was observed for 2012 (Fig. 1).

The foreign-based offshore tuna longline fleet was defined because they unload catches at foreign ports. For domestic-based longline fleet, the landing records from local fish markets provide the best catch information, while catch estimates for the foreign-based longline vessels were preliminarily based on fishing vessels activities, import statistics of Japanese markets, and monthly catch reports from the captains (Fisheries Agency of Taiwan, 2013).

References

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Table 1. Comparison between the updated catch data of swordfish for Taiwanese offshore tuna longline fishery and the data previously submitted to ISC13 and WCPFC-SC1.

Year	Updated data	ISC13 Report		WCPFC-SC1	
			Difference	Report	Difference
1999	1385	1385	0		
2000	3390	1531	1859	3147	243
2001	3812	1691	2121	3694	118
2002	3766	1557	2209	2511	1255
2003	3615	3687	-72	3196	419
2004	3365	3364	1	3167	198
2005	3572	3572	0		
2006	3944	3944	0		
2007	3754	3754	0		
2008	3407	3407	0		
2009	3177	3177	0		
2010	2379	2313	66		
2011	3207	3075	132		
2012	3695	3861	-166		

Table 2. Catch estimates of swordfish by stock for various Taiwanese fisheries.
 “Others” includes offshore and coastal gillnet, set-net, harpoon, and all other fisheries.
 DWLL: distant-water longline fishery; OSLL: offshore longline fishery.

Year	WCNPO				EPO			
	DWLL	Domestic-based OSLL	Foreign-based OSLL	Others	Sum	DWLL	OSLL	Sum
1959		427		91	518			
1960		520		127	647			
1961		318		73	391			
1962		494		62	556			
1963		343		18	361			
1964	0	358		10	368	0		0
1965	0	331		27	358	0		0
1966	0	489		31	520	0		0
1967	0	646		35	681	21		21
1968	0	763		12	775	15		15
1969	0	843		7	850	6		6
1970	0	904		5	909	24		24
1971	0	992		3	995	14		14
1972	0	862		11	873	22		22
1973	0	860		119	979	19		19
1974	0	880		136	1016	22		22
1975	11	899		153	1063	8		8
1976	10	613		194	817	31		31
1977	3	542		141	686	27		27
1978	0	546		12	558	6		6
1979	7	661		33	701	16		16
1980	11	603		76	690	7		7
1981	1	656		25	682	25		25
1982	1	855		49	905	14		14
1983	0	783		166	949	5		5
1984	0	733		264	997	9		9
1985	0	566		259	825	8		8
1986	0	456		211	667	11		11
1987	1	1328		190	1519	25		25
1988	0	777		263	1040	23		23
1989	4	1491		38	1533	103		103
1990	5	1309		154	1468	29		29
1991	10	1390		180	1580	44		44
1992	2	1473		243	1718	16		16
1993	58	1174		310	1542	13		13
1994	0	1155		219	1374	18		18
1995	71	1135		225	1431	2		2
1996	10	701		32	743	24		24
1997	20	1358		61	1439	26		26
1998	22	1178		41	1241	80		80
1999	63	1385		61	1509	69		69
2000	64	1531	1859	86	3540	283		283
2001	121	1691	2121	91	4024	2095		2095
2002	155	1557	2209	27	3948	3088		3088
2003	144	2196	1347	11	3698	1648	72	1720
2004	502	1828	1483	16	3829	1375	54	1429
2005	269	1813	1666	26	3774	713	93	806
2006	203	2587	1243	61	4094	915	114	1029
2007	191	2907	811	26	3935	783	36	819
2008	162	2471	924	48	3605	427	12	439
2009	147	2323	778	121	3369	663	76	739
2010	231	1917	355	52	2555	994	107	1101
2011	366	2501	420	78	3365	790	286	1076
2012	576	2644	357	48	3625	815	694	1509

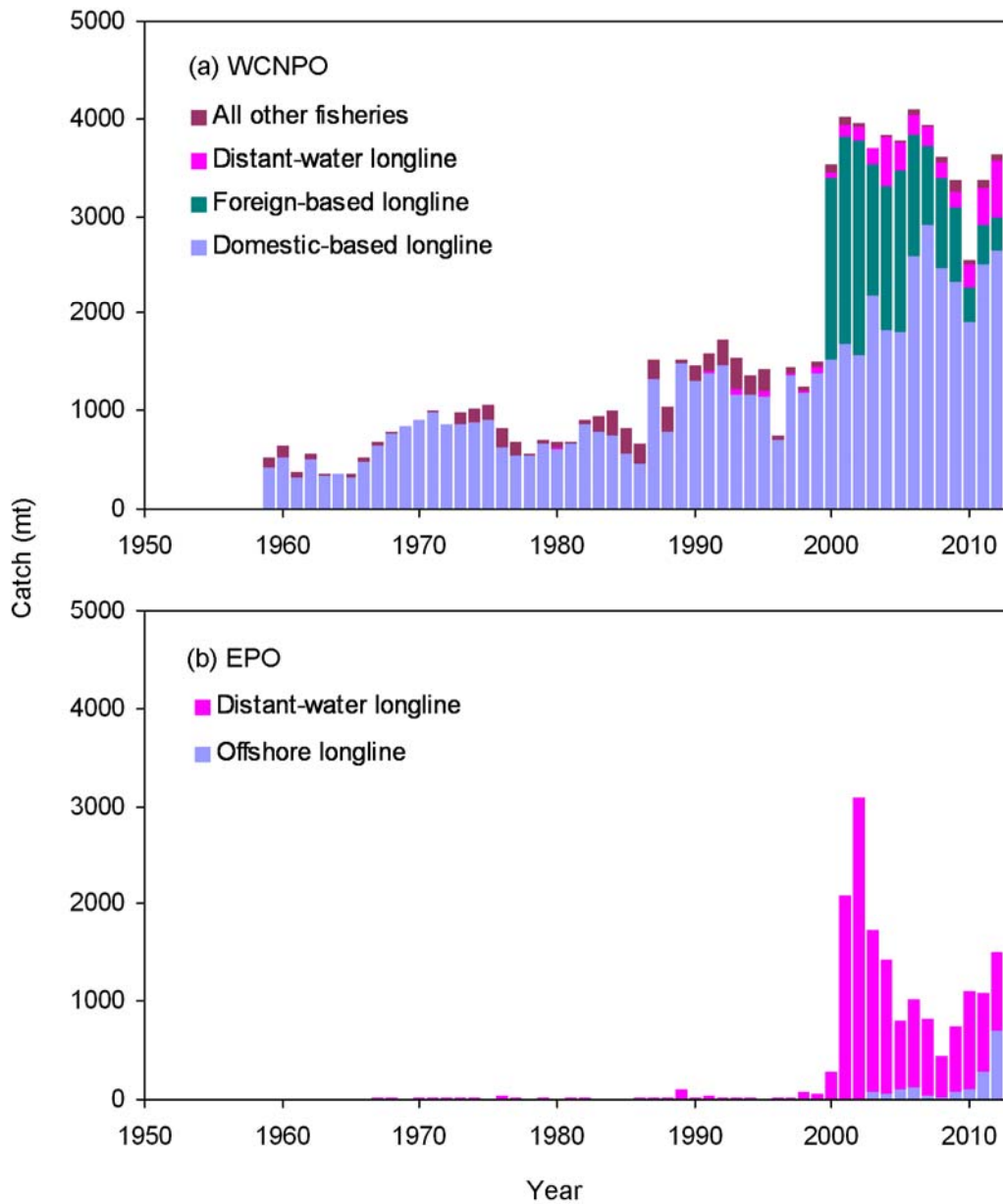


Fig. 1. Catches of swordfish (1959-2012) by stock for various Taiwanese fisheries. All other fisheries include offshore and coastal gillnet, set-net, harpoon, and all other fisheries.