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Chinese Taipei's Annual Report

2018 National Report of Chinese Taipei to SPRFMO Scientific Committee on the Squid Jigging Fishery in the Southeast Pacific Ocean

Summary

Jumbo flying squids inhabit in the eastern Pacific and have been targeted by Chinese Taipei's squid-jigging fleet since 2002. The number of operating fishing vessels varied from 5 to 29 between 2002 and 2017. The catch of jumbo flying squid was 7,338 tons in 2017, less than that of 2016 (12,989 tons). The nominal CPUEs of this fishery were at a similar level for 2016-2017. The major fishing grounds were located around 75–83°W and 14–25°S, while few vessels operated in the region of 115–119°W and 2°N–2°S in 2017. Data of logbook, transshipment and landing of Chinese Taipei's squid-jigging fleet have been collected entirely and submitted to the Secretariat of SPRFMO. Researches on the stock status and spatial dynamics of jumbo flying squid have been conducted. The length composition of jumbo flying squid was converted from weight category. A biological sampling program has been conducted by one study vessel in the fishing season of 2018. The observer program, modified from tuna fishery, has been developed in 2018.

1. Description of the Fishery

Jumbo flying squid (*Dosidicus gigas*, also known as Humboldt squid) is a large pelagic squid inhabiting in the eastern Pacific Ocean and its distribution reaches about latitude 50° for both North and South hemispheres. This species has been targeted by Chinese Taipei's distant-water squid-jigging fleet in the Southeast Pacific Ocean since 2002. The number of operating vessels varied from 5 to 29 between 2002 and 2017 (Figure 1).

The monthly number of vessels for Chinese Taipei's squid-jigging fleet varied inter-annually between 2013 and 2017 (Figure 2). The monthly operation days deployed by Chinese Taipei's squid-jigging fleet in 2017 ranged from 16 days to 300 days (Figure

3). The main fishing season for *D. gigas* by Chinese Taipei's squid-jigging fleet occurred from October to December in 2017.

2. Catch, Effort and CPUE Summaries

Annual catch and fishing efforts of Chinese Taipei's squid-jigging fleet from 2013 to 2017 is shown in Table 1. The annual catch was 7,338 tons in 2017, which was lower than that of 2016 (12,989 tons). The fishing effort (vessel-day) was 1228 v-d in 2017.

The annual nominal CPUE (tons/vessel-day) of Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean from 2013 to 2017 is shown in Figure 4. The nominal CPUE value was 5.98 tons/vessel-day in 2017.

The annual spatial distributions of average CPUE (tons/vessel-day) of Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean from 2013 to 2017 is shown in Figure 5. The major fishing ground for this fishery was around 12–29°S and 74–84°W. There had been a number of fishing vessels operating within the EEZ of Peru between 2007 and 2010 with permission of fishing licenses issued by the competent authority of Peru. However, Chinese Taipei's squid-jigging fleet only operated in the high seas of the Southeast Pacific Ocean during the period of 2011 to 2017. The fishing ground for the fishery located around 75–83°W and 14–25°S in 2017, and there were few vessels operated in equatorial waters (115–119°W and 2°N–2°S).

3. Fisheries Data Collection and Research Activities

3.1. Logbook system

All of Chinese Taipei's squid-jigging vessels have been required to maintain fishing logbooks on a daily basis. All of the logbooks had been retrieved between 2002 and 2017. In addition, Chinese Taipei's distant-water squid-jigging vessels have been required to

equip with electronic logbook system (e-logbook) on board since 2007 and to submit their catch information through this system on a daily basis.

3.2. Transshipment and landing data collection

In accordance with Chinese Taipei's domestic regulations of, relevant information of transshipment and landing for *Dosidicus gigas* fishery in the Southeast Pacific Ocean has been collected by the competent authorities and has been submitted to the Secretariat of SPRFMO since 2013 as per CMM 02-2018.

3.3. Research

Researches on the stock status and spatial dynamics of *Dosidicus gigas* have been conducted by the scientists of Chinese Taipei. In recent years, research projects have been carried out on spatial distribution patterns, CPUE trend, stock status and exploitation rate of this species. The result of researches showed that the distribution of *D. gigas* abundance was higher in the coastal waters off northern Peru. The size composition harvested by Chinese Taipei's fleet has been dominated by large-size group in recent years. The results of GAM suggested that the variation of squid abundance could be explained by the temporal and spatial variables to a degree. It may result from a long-distant migration pattern for the jumbo flying squid and plasticity in life-history traits of squid populations with a decreasing trend of squid abundance index since 2005 which has also been noted.

3.4 Sampling programs

A sample collection program has been conducted in the fishing season of 2018 for basic biological information and population structure studies of *D. gigas* in the Southeast Pacific. The program is conducted by one study vessel of Chinese Taipei which plan to retain ca. 10 whole-body specimens monthly during the fishing season. The collected samples are carried by the study vessel and the vessel will back to fishing port in Kaohsiung in early

2019.

4. Biological Sampling and Length/Age Composition of Catches

The logbook for Chinese Taipei's *D. gigas* fishery includes size categories (commercial category in weight). Four categories are recorded: A, <1 kg; B, 1-2 kg; C, >2 kg; and D, processed products (head, tube and fin). The live weight of category D is calculated by a ratio between head, mantle weight and body weight. The processed products might comprise various size categories of the squid, while almost dominated by the extra-large size (>2 kg) individuals. The annual catch by size compositions of *D. gigas* between 2013 and 2017 is presented in Table 2.

5. Ecosystem Approach considerations

There was no bycatch record for the Chinese Taipei's squid-jigging fleet in 2017. This may be a result of performing highly selective fishing gears (jigging) and method by the squid-jigging fleet.

6. Observer Implementation Reports

The observer program of Chinese Taipei's *D. gigas* fishery is developing since early 2018. The observer program for squid fishery is modified from the observer program for tuna fishery which has been accredited by Regional Fisheries Management Organizations in the Western and Central Pacific.

Table 1: Annual catches of *Dosidicus gigas* and fishing effort of Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean between 2013 and 2017.

Year	No. of vessels	Fishing effort (vessel-day)	Catch (tons)
2013	9	1045	7759
2014	5	474	4795
2015	9	616	10072
2016	11	1880	12989
2017	13	1228	7338

Table 2: Annual catches (tons) of *Dosidicus gigas* by size composition (in live weight) of Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean between 2013 and 2017. (Category: A, <1 kg; B, 1-2 kg; C, >2 kg; D, non-categorized)

Year	A	B	C	D	Total
2013	205	0	12	7542	7759
2014	50	1	1	4743	4795
2015	33	41	1	9996	10072
2016	210	62	23	12694	12989
2017	123	12	6	7197	7338

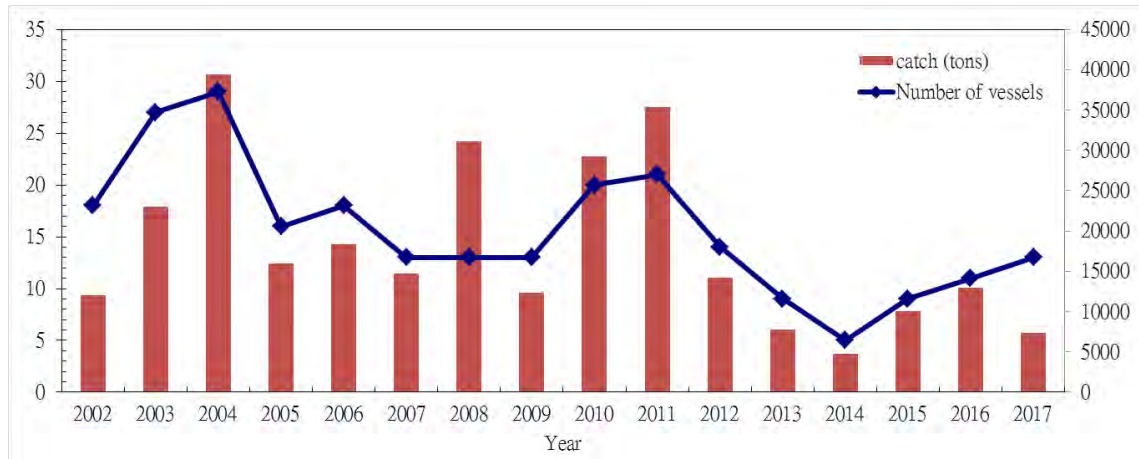


Figure 1. Annual variations in number of vessels and catch for Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean between 2002 and 2017.

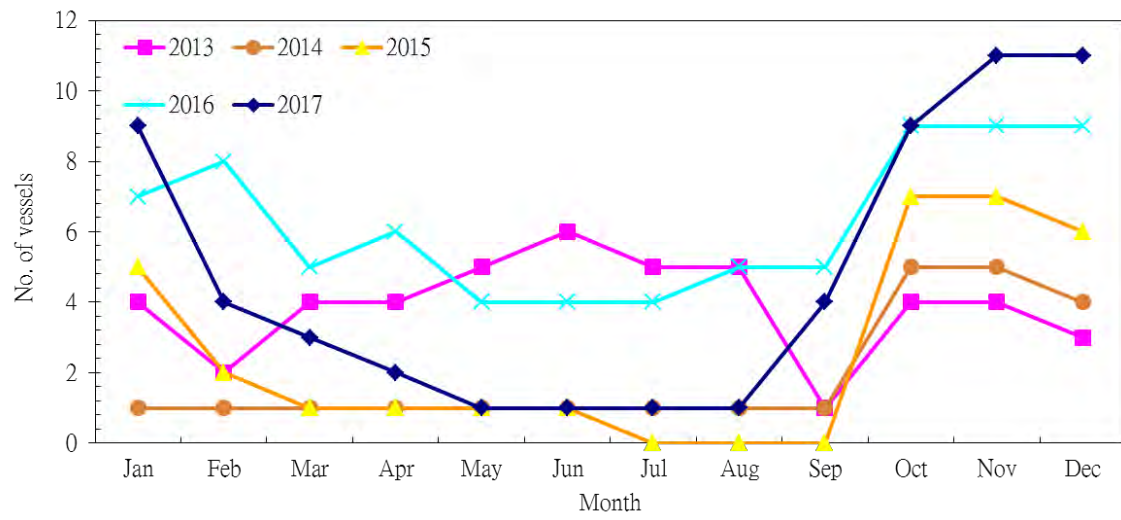


Figure 2. Monthly variations in number of vessels for Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean from 2013 to 2017.

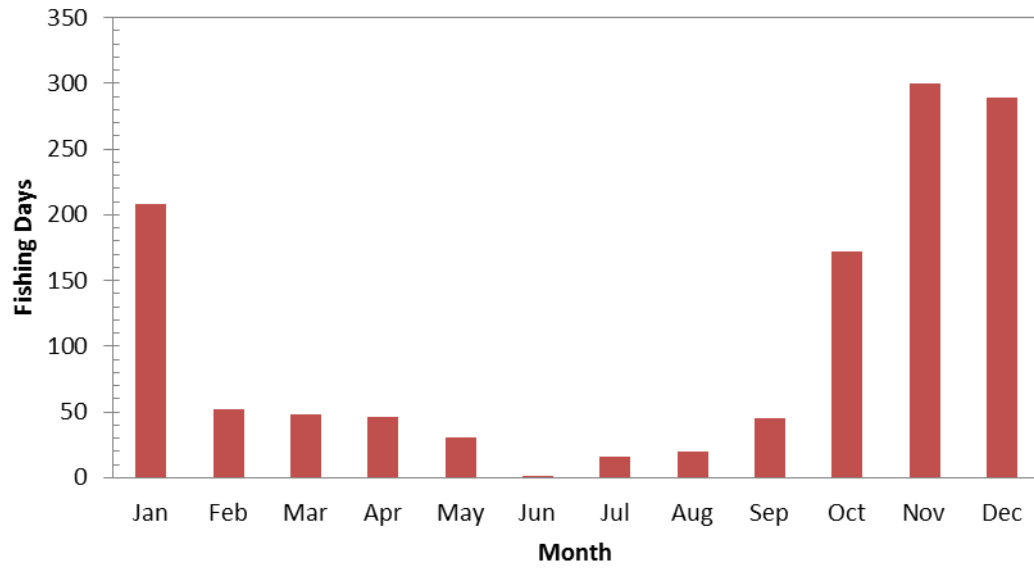


Figure 3. Monthly fishing days deployed by Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean in 2017.

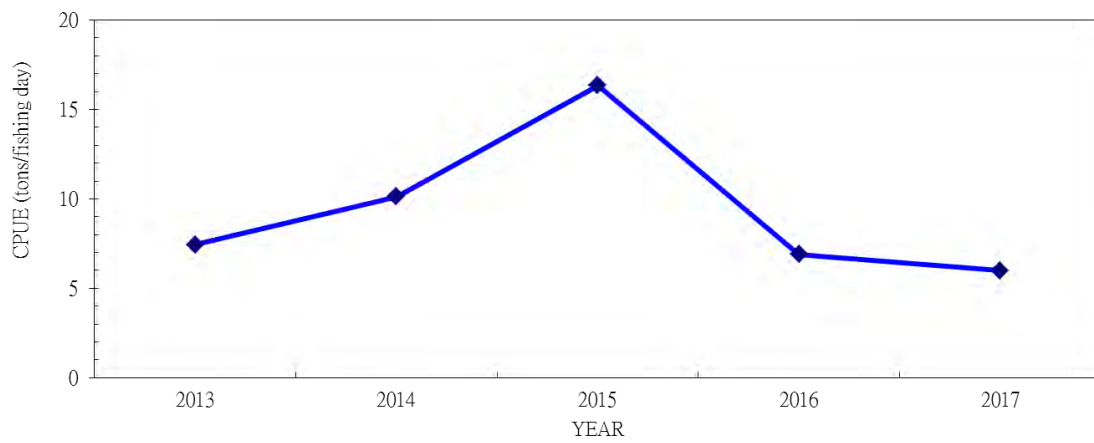


Figure 4. Annual nominal CPUE of *Dosidicus gigas* of Chinese Taipei's squid-jigging fleet in the Southeast Pacific Ocean between 2013 and 2017.

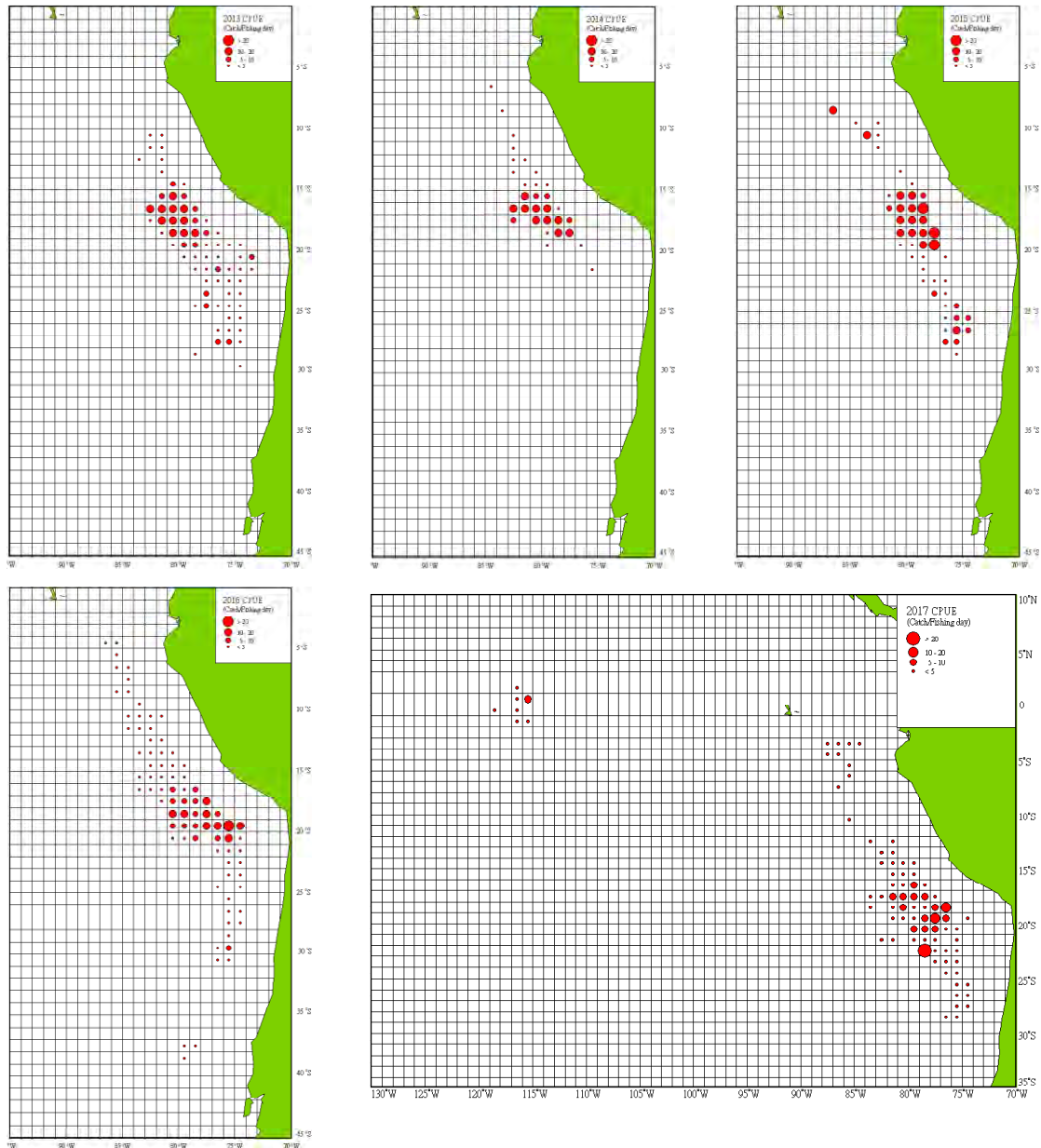


Figure 5: Spatial distributions of annual average CPUE of *Dosidicus gigas* of Chinese Taipei’s squid-jigging fleet in the Southeast Pacific Ocean from 2013 to 2017.