SWG-09-09

ANNUAL NATIONAL REPORT TO THE SPRFMO SCIENCE WORKING GROUP.

JACK MACKEREL FISHERY IN CHILE

GOBIERNO DE CHILE
SUBSECRETARÍA DE PESCA

October, 2010.

1. DESCRIPTION OF THE FISHERY.

1.1 Composition of the fleet.

Over the last five years, the size of the fleet authorized to fish for jack mackerel in the EEZ and in the high seas, as well as its structure has remained stable. Close to 133 vessels have remained in operation, most of which are vessels with a hold capacity ranging between 300-600 m3 to 900-1200 m3 (Table I).

The size of this fleet authorized as remained constant at around 284 vessels during the last five years. No major interannual variations are observed, and most vessels have a hold capacity ranging from 300-600 m3 to 600-900 m3 (Table II).

Table I. Number of vessels operating on jack mackerel in high seas and the EEZ with purse seine nets, per year and hold stratum, 2005-2009.

Year	Total	N° of vessels per hold capacity (m^3)						
		0-300	300-600	600-900	900-1200	1200-1500	1500-1800	1800-2100
2005	143	18	75	8	21	9	10	2
2006	135	14	69	9	20	9	10	4
2007	131	12	66	10	19	9	10	5
2008	126	8	65	9	19	10	10	5
2009	129	8	65	10	19	10	11	6

Source: Undersecretariat for Fisheries

Table II Number of vessels authorized to operate on jack mackerel (Chilean jack mackerel regime applied to the Chilean fishery), per hold stratum, 2005-2009.

Year	Total .	N° of vessels per hold capacity (m^3)						
		0-300	300-600	600-900	900-1200	1200-1500	1500-1800	1800-2100
2005	289	68	113	46	36	14	9	3
2006	286	63	114	47	36	13	10	3
2007	284	61	115	46	35	13	10	4
2008	282	60	115	44	34	15	10	4
2009	280	58	115	44	34	15	10	4

Source: Undersecretariat for Fisheries

1.2 Catches, seasonality of catches and fishing ground.

Over the last 5 years, the annual jack mackerel catches show a progressive decline from 2005 to 2007, with volumes that dropped from 1,43 to 1,3 million t. In 2008 y 2009 this trend became more evident reaching 896 and 834 thousand tons, respectively. The annual chub mackerel catches show equally a progressive decline from 2006 to 2009, with volumes that dropped from 368 to 158 thousand t.

Table III. Jack mackerel and chub mackerel catches inside and outside the EEZ with purse seine nets, per area and year, 2005-2009

Years	Jack mackerel (t)	Chub mackerel (t)
2005	1.430.434	280.756
2006	1.379.941	368.786
2007	1.302.784	297.189
2008	896.108	133.018
2009*	834.927	158.452

*Source: SERNAPESCA Preliminary.

The 2009 jack mackerel catches were concentrated in the first semester, reaching monthly volumes around 100 thousand tons between January and July, and showing reduced catches in the subsequent period (Figure 1).

This behavior differs from previous years, in which a decreasing tendency was shown in the January-June catches, reaching higher catch levels in the May-July.

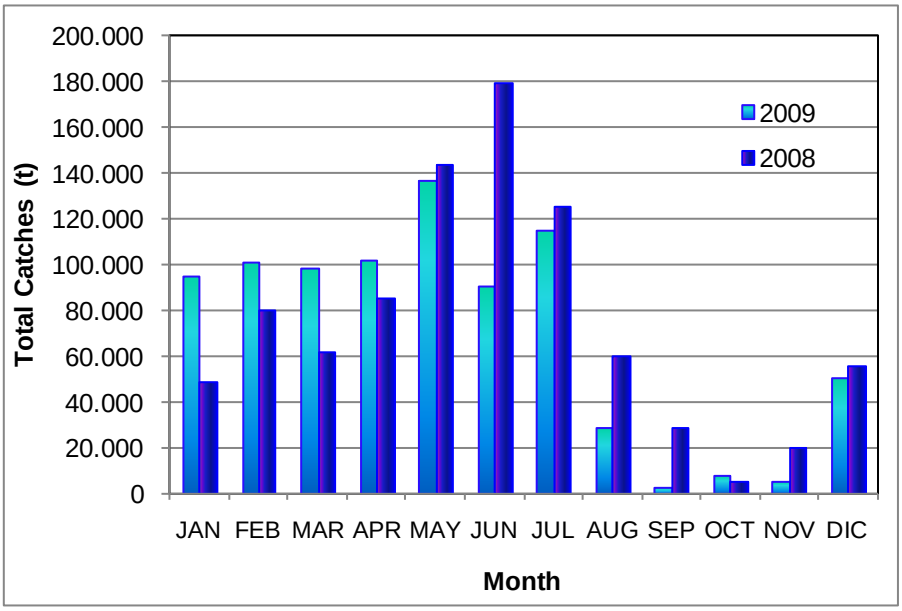

Figure 1: Seasonality of industrial jack mackerel purse-seine fishery, 2008-2009. Source: SERNAPESCA.

Spatial distribution of catches in the northern area of the country show in 2009 a pattern similar to previous years, characterized for its proximity to the coast, not exceeding the 100 nautical miles.

On the other hand, a more dynamic pattern is observed in the southern zone, characterized by a south-western displacement, then a movement of the fleet towards north, following the jack mackerel to the high seas. It is important to note that in 2009 the fleet moved south early in March, thus operating more southwards than in previous years (Figure 2).

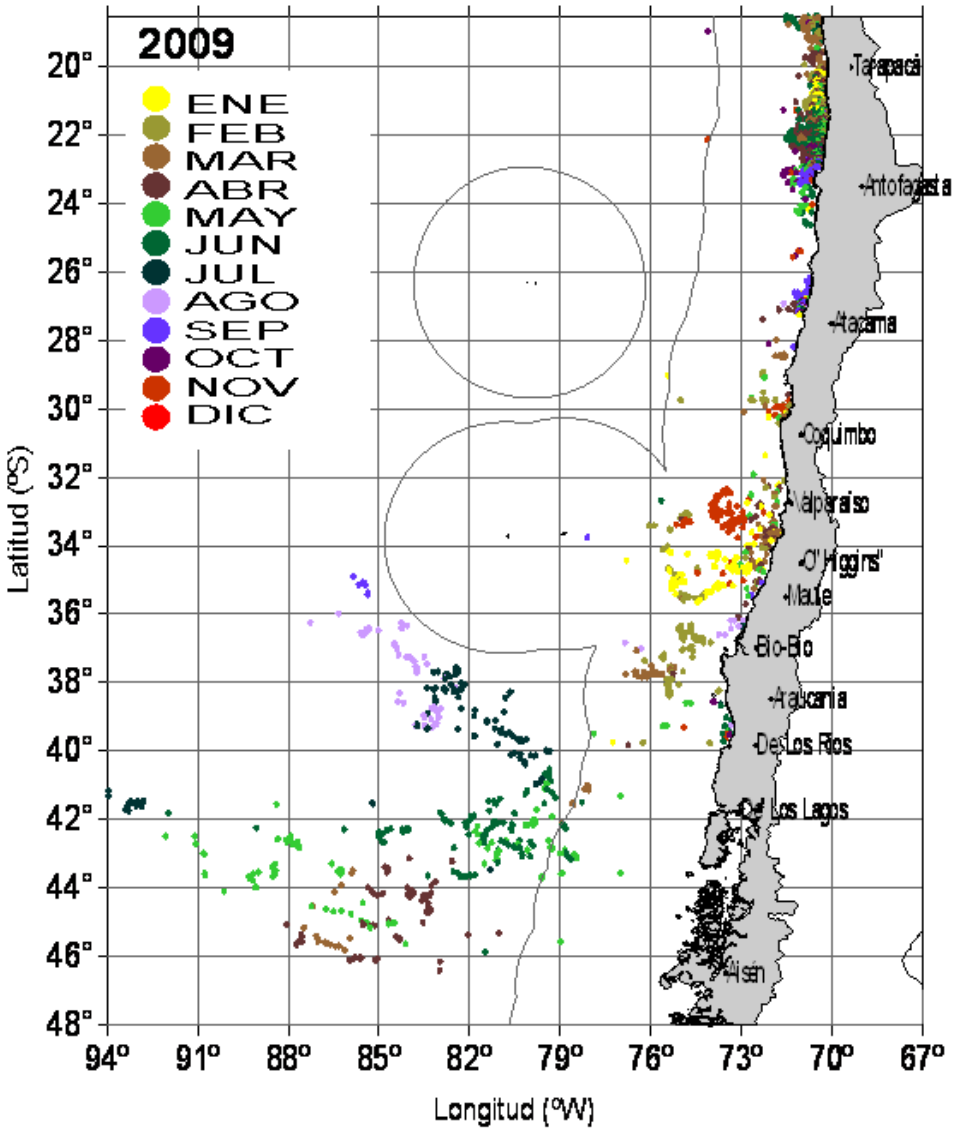

Figure 2: Spatial-temporal distribution of industrial jack mackerel purse seine fleet, 2009. Source: IFOP.

2. CATCHES, EFFORTS AND CPUE IN THE JACK MACKEREL FISHERY.

2.1 Trends in catches.

At the beginning of the jack mackerel fishery, the catch presented a growing tendency until 1995, when it reached 4.4 million tons, decreasing then to reach 1.2 million tons in 1999. Since 2001, stability is achieved around 1.4 million tons, due to the implementation of different management measures, such as the TACs. However, a new decrease in 2008 and 2009 was observed, reaching levels of 896 and 834 thousand tons, respectively (Figure 3)

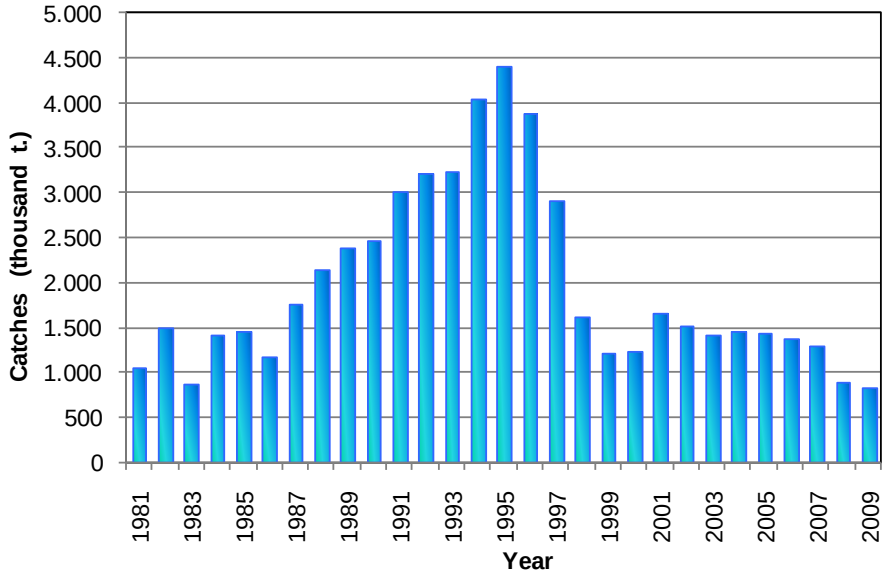

Figure 3 : Total catch of jack mackerel with purse-seine, 1981-2009.
Source: IFOP- SERNAPESCA.

The species associated to these catches are recorded and classified by frequency as main and secondary associated species, as shown in tables IV and V, respectively.

Table IV. Main species associated to catches of jack mackerel with purse-seine fishing gear.

. COMMON NAME	SCIENTIFIC NAME
Chub Mackerel	*Scomber japonicus*
Patagonian Grenadier	*Macruronus magellanicus*
Araucanian Herring	*Strangomera bentincki*
Anchovy	*Engraulis ringens*

Source: IFOP.

Table V. Secondary species associated to jack mackerel catches with purse-seine fishing gear.

COMMON NAME	SCIENTIFIC NAME
Atlantic Saury	*Scomberesox saurus*
Mote Sculpin	*Normanichthys crockeri*
Eastern Pacific Bonito	*Sarda chilensis*
White Warehou	*Seriolella caerulea*
Palm Ruff	*Seriolella violacea*
Common Dolphinfish	*Coryphaena hippurus*
Jumbo Squid	*Dosidicus gigas*
Pacific Menhaden	*Ethmidium maculatum*
South Pacific Hake	*Merluccius gayi*
Starry Butterfish	*Stromateus stellatus*
Parona Leatherjacket	*Parona signata*
Roncacho	*Sciaena spp.*
South American Pilchard	*Sardinops sagax*

Source: IFOP.

2.2 Fisheries effort trends.

The description of the fishing effort considers only information on the fleet operating in the center-southern zone, as it is the only fleet catching jack mackerel as its target species.

Performance of the fleet shows a gradual increase in the duration of fishing trips, reaching about 7 days during 2008 and 2009. This is the result of the fishing grounds remoteness, which causes a decreasing tendency of the fishing effort; example of this is the progressive decrease of fishing trips with catches, total trips and displaced hold capacity in m^3 (Figure 4 and 5). Nonetheless, efficiency of the fleet, defined as the proportion of trips with catches over total trips, has maintained high levels –around 95%- decreasing over the last two years (Figure 5).

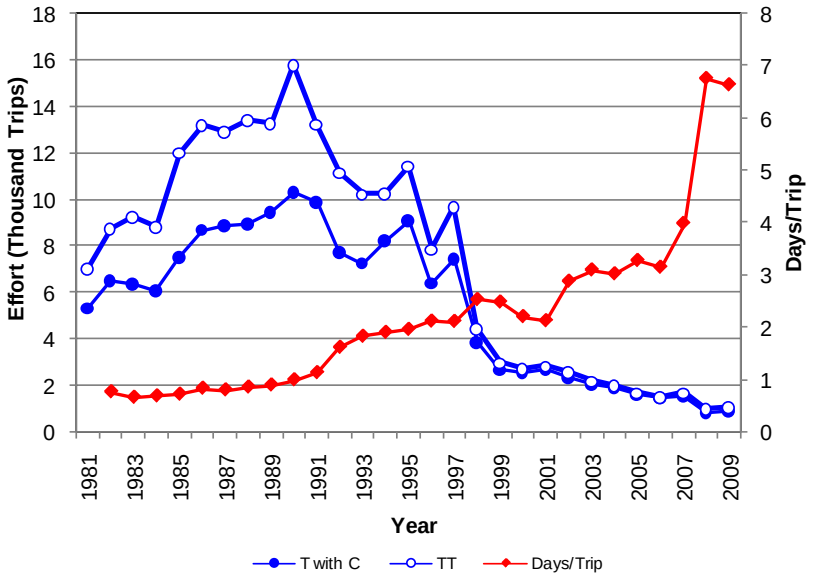

Figure 4: Number of trips with catch (T with C), total trips (TT) and duration of trips in days of the purse seine fleet in the center-southern zone, 1981-2009. Source :IFOP.

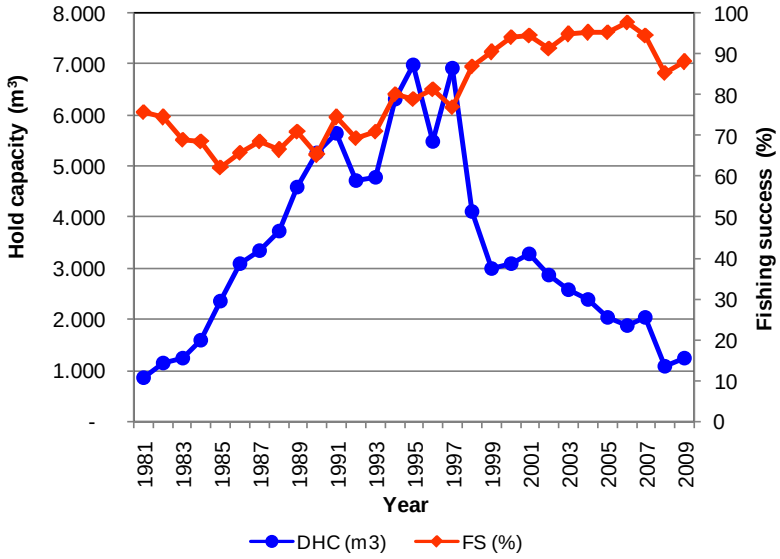

Figure 5: Displaced hold capcity (DHC) and percentage of fish success (FS) of the purse seine fleet in the center-southern zone, 1981-2009. Source :IFOP

2.3 CPUE trends[1] .

Nominal CPUE of the central-southern fleet is described by two indicators: tons per trip with catch, and tons per total trips. Both show a general increasing trend until 2005, keeping since then around 600 tons. yield by fishing trip with catch (Figure 6).

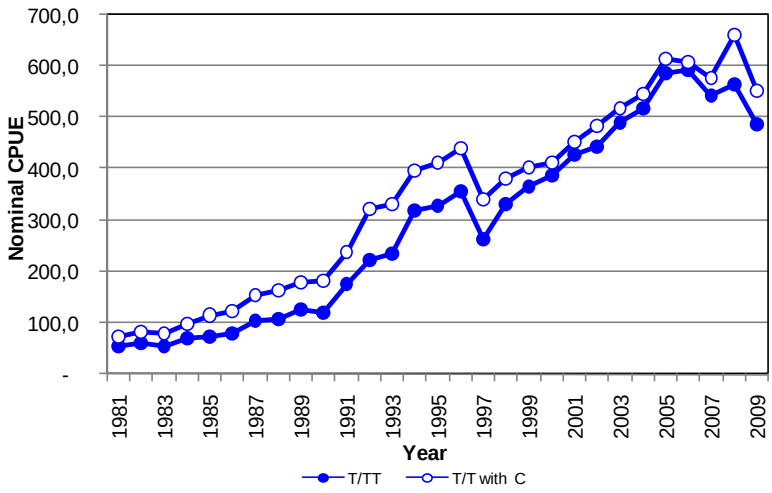

Figure 6. Nominal CPUE; tons of jack mackerel by total trips (T/TT) and tons of jack mackerel by fishing trips (T/T with C), using purseine gear, 1981-2009.

3. RESEARCH ACTIVITIES[2].

The annual research program in 2009 included the following projects, all of them conducted by IFOP:

- Monitoring of pelagic fishing activities in the north and center-south areas of Chile by collecting and analyzing biological, fishing and commercial data on the main pelagic resources.

- Hydro-acoustic assessment of jack mackerel from regions XV to II and V to X, to obtain a quantification of the biomass of jack mackerel through direct methods.

[1] As indicated in document # 10 CHJMWS and document Fishing Indicators submitted by Chile in the VIII Science Working Group Meeting, it is not possible to use this index as a relative abundance indicator.

[2] For further details see document CHJMW # 24, "Research and management of Chilean Jack Mackerel (*Trachurus murphyi*) exploited in the South East Pacific Ocean" or SPRFMO –III – SWG-18

- Stock assessment and estimates of total allowable catch (TAC): Diagnosis of the exploitation status of the resource and establishment of its TAC.

4. BIOLOGICAL SAMPLING AND LENGTH AND AGE COMPOSITION OF CATCHES.

4.1 Biological sampling [3].

Biological information is obtained from the samplings along the Chilean coast, both for the target species (jack mackerel) and the associated species. Sampling is conducted at a daily level, mainly in landing/discharge sites, complemented by the information recorded by scientific observers, including measuring fork length of the fish, extracting otolith, and measuring total weight, gutted weight and gonad weight. In addition, sex and maturity stage of each specimen are recorded.

Table VI shows biological and length samplings, by port, conducted during 2009. They account for 77,196 length samplings, 24,264 biological samplings, which include extraction of 10,131 otolith pairs.

Table VI. Number of jack mackerel specimens subject to biological and length samplings, by landing port, conducted in 2009.

Port	Length Sampling	Biological samplings	
	Nº specimens	Nº specimens	Nº otolith
ARICA	2,484	376	153
IQUIQUE	12,014	1,662	403
ANTOFAGASTA	17,849	2,334	705
CALDERA	7,616	2,260	1,134
COQUIMBO	5,173	1,549	1,142
SAN ANTONIO	354	257	
SAN VICENTE	20,814	6,101	2,910
LOTA-CORONEL	10,696	9,544	3,499
CORRAL	196	185	185
TOTAL	**77,196**	**24,268**	**10,131**

Source: IFOP

[3] For further details see document SPRFMO-V-D&IWG; "Brief description of the jack mackerel sampling in the Chilean fisheries".

4.2 Length and age composition of catches.

a.- Jack mackerel size composition.

The structure of jack mackerel catches show a similar range over the last years, with a multimodal distribution, standing out a mode around 23 cm FL and another between 29 and 36 cm FL, mainly related to catches in the central-southern zone, which has gradually reduced its contribution (Figure 7).

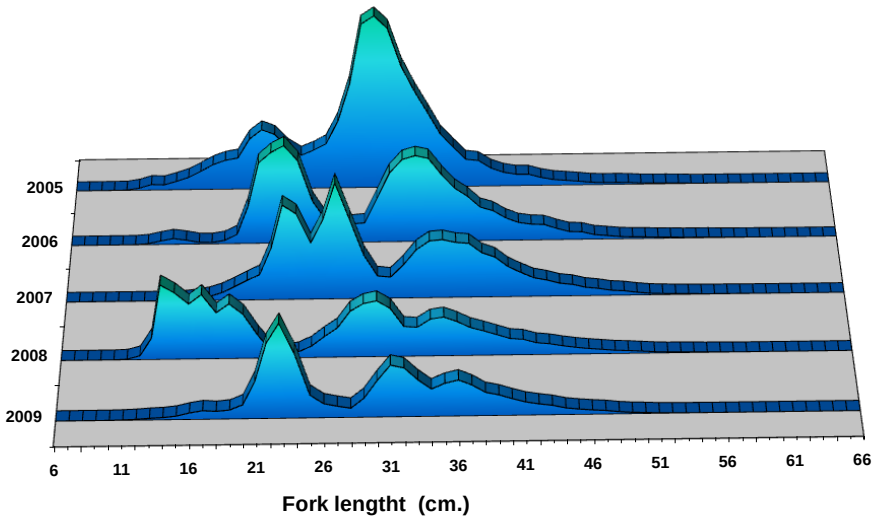

Figure 7: Length structure of jack mackerel catches in number, 2005-2009. Source: IFOP.

b.- Jack mackerel age composition.

Age structure of catches presents a bimodal distribution, with mode concentrated in specimens ages III and IV, which is stable over time and another mode ages VII and VIII, composed by specimens especially from the central-southern zone (Figure 8).

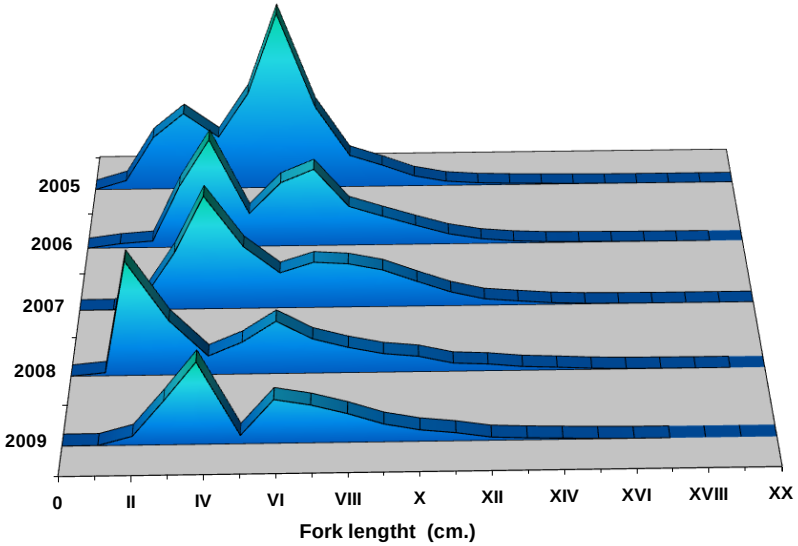

Figure 8: Age structure of jack mackerel catches in numbers, 2005-2009. Source: IFOP.

c.- Chub mackerel size composition.

The structure of chub mackerel catches in the central southern zone show a continuous shift of the mode toward larger sizes during the last four years (2005-2008). In 2005 the main mode was at 32 cm. FL and catches continue to be sustained by the same cohort in 2008, with a mode at 37 cm. FL. (Figure 9).

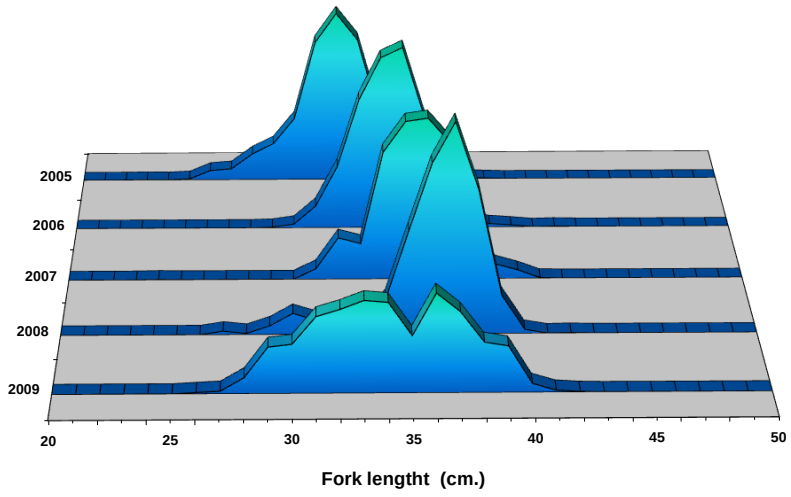

Figure 9: Size structure of chub mackerel catch in percentage, 2005-2009. Source: IFOP.