

RECENT PAST AND PRESENT OF THE SPANISH FISHERY OF ANCHOVY (*Engraulis encrasicolus* Linnaeus, 1758) IN ATLANTIC MOROCCAN WATERS



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ABSTRACT

The fishery of small pelagic species such as anchovy and sardine in Northern Morocco has been a common practice during centuries for vessels coming from the Southern region of the Iberian Peninsula. The enforcement of the Law of the Sea firstly led to the Spanish Fishery Administration and then to the EU (from 1988 onwards) to negotiate the access to the Moroccan fishery resources through fishing agreements. Fisheries in Morocco were closed to the European fleet by the end of November 1999. After six years of closure, a new fishing agreement signed in 2006 between the Kingdom of Morocco and the EU has allowed the Andalusian purse-seine fleet based at Barbate (Cádiz, SW Spain) to re-start its fishery in the Atlantic Moroccan waters in April 2007. Anchovy is the target species of this fleet in the Atlantic Moroccan fishing ground, due to its high economical value. This species accounted for 88% of the total catches for this fleet during the period 1988-1999. The great importance of this fishery is reflected by catch levels as high as more than 12000 t in certain years of higher anchovy's abundance (1998, 1999). This work is a compilation of the existing information gathered by the Instituto Español de Oceanografía (IEO) on the Spanish anchovy fishery before the 3rd Morocco-EU fishing agreement expiration in 1999 (period 1988-1999) and after the renewal of the agreement and re-open of this fishery in April 2007.

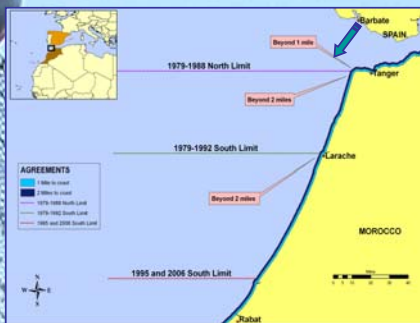


Figure 1.- Map of the fishing zones allowed to the purse-seine fishery in North Atlantic Moroccan waters by the different Fishing Agreements.

AGREEMENT	CATEGORY	ZONE	DISTANCE TO COAST	DEEP (METER)	NUMBER OF VESSELS	CLOSE SEASONS	GRT	OBSERVATIONS
1979							3500	
1983	Season/Northern Cape Nuan	Between Tangier and Larache (34°48' - 34°52')	Beyond 3 miles	500 m x 90 m			3500-10000	
1988			1 mile (24°47' 30" N)	500 m x 90 m			3500	
1992	Season/Northern Atlantic	North of 34°52'	2 miles (34°52' - 34°54')	500 m x 90 m	18 (100%)		3500	
1995	Season/Northern	North of 34°52'	1 mile (34°52' - 34°54')	500 m x 90 m	28 (100%)	2 months: February and March	3500	
2006	Small-Scale Fishing/Northern Season etc.	North of 34°52'	Beyond 2 miles	500 m x 90 m	20			Ban of fishing with largest nets. Requirement of landings in Morocco.

Table 1.- Management measures regulating the purse seine fishery in North Atlantic Moroccan waters by the different Fishing Agreements.



MANAGEMENT OF THE SPANISH PURSE-SEINE FISHERY IN MOROCCAN WATERS

Purse-seine fishing by the Spanish vessels in Moroccan waters has been controlled by the Moroccan Government since the enforcement of the Law of the Sea (see Figure 1). Management measures mainly consist on an effort control (through GRTs limitations regulated by the different agreements) and technical measures such as the limitation of the fishing areas (see Figure 1), close seasons and gear size (Table 1).

BRIEF HISTORY OF THE SPANISH ANCHOVY FISHERY IN WATERS OFF MOROCCO



THE BARBATE'S PURSE-SEINE FLEET

The Andalusian purse-seiners were benefited from quarterly licenses within the frame of the different Fishing Agreements previous to the current one, signed between the EC and Morocco (2006). The vessels which have usually been benefited from this licenses system belong to a fleet segment of heavy-tonnage purse-seiners based at Barbate (Cádiz, SW Spain), the so called Barbate's "Troikas". These vessels have traditionally alternated the small pelagics fishery in the North West Moroccan fishing ground and that in the Spanish waters off the Gulf of Cádiz, depending on the abundance of the resources in one zone and another.

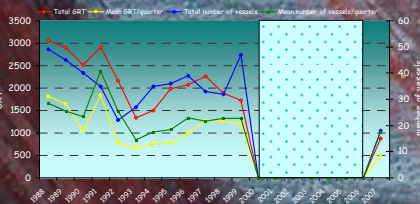


Figure 2.- Annual evolution of GRT and number of vessels of the Barbate's purse-seine fleet in the Moroccan fishing ground (Period 1988-2007).

LANDED SPECIES

Anchovy (*Engraulis encrasicolus*) constitutes the target species for the Barbate's purse-seine fleet off North West Moroccan waters. It accounts for more than 77 percent of the total landings in average, its contribution being higher than 85 percent in most of the analysed years (Figure 3). The lower percentages of anchovy were landed during the period 1992-1995. *Sardine* (*Sardinia pilchardus*) represents the second species in landings, accounting for less than 20 percent of the landings in most of the years. Only in 1993, the contribution of sardine landings (49.8 percent) was higher than the anchovy's, which recorded the lowest value in the series (see Figure 4). The rest of the species show a low relative importance in the landings. These species belong, in order of importance, to the groups *Trachurus spp.* and *Scorpaenidae spp.* The horse mackerel species group represents 3.4 percent in landings as an average in the whole series and only in 1994 and 1996 accounted for more than 12 percent. The average percentage of the mackerel species group in the total landings was lower than 1.4 percent, this relative importance showing a decreasing trend along the analysed historical series.

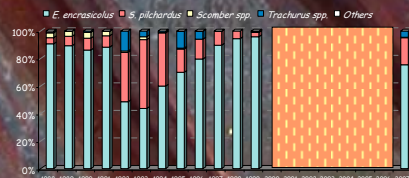


Figure 3.- Species composition in landings. Period 1988-2007.

The general trend throughout the Fishery Agreements shows a decrease of the GRT (with the exception of 1991) until minimal values in 1993 (Figure 2). The following years, it softly increased because of the lower restricted conditions of the 1995 Agreement (see Table 1). The total number of Spanish purse-seiners fishing in the Moroccan fishing ground decreased until a minimum of 22 vessels occurring in 1992. From this year onwards, this number increased, reaching a maximum of 47 vessels fishing before the end of the last Agreement in 1999. The trends of the total annual number of vessels and the quarterly one, do not coincide because of the rotating licenses system deployed by the Barbate's fleet. Through this system, different vessels rotated the licenses from one quarter to another. In this way, all the licensed vessels of this fleet were able to fish in Moroccan waters throughout one year. In 2007, the Barbate's fleet has re-incorporated to the Moroccan fishing ground with 19 vessels of the 20 allowed ones in the last Agreement. In this year the GRT and number of vessels (total and monthly) showed the lowest values of the analysed historical series.

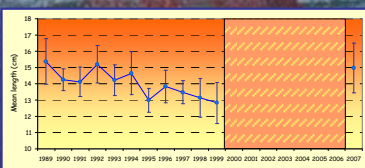


Figure 6.- Spanish anchovy fishery in Atlantic Moroccan waters: evolution of anchovy mean length (cm) in landings. Period 1989-2007.

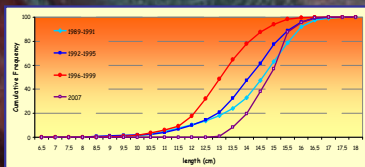


Figure 7.- Spanish anchovy fishery in Atlantic Moroccan waters: cumulative size (cm) frequency distribution (%) of landings.

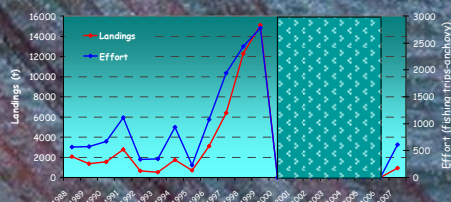


Figure 4.- Spanish anchovy fishery in Atlantic Moroccan waters: annual evolution of landings (tonnes) and nominal species-specific effort (fishing trips with positive anchovy catch). Period 1988-2007.

The landings of this fleet, after its re-incorporation in 2007 have only represented the 6 percent of the 1999 landings although the effort was the 22 percent of the one applied that year.

ANCHOVY LANDINGS AND EFFORT EVOLUTION

Anchovy landings of the Spanish fleet in Moroccan waters have oscillated between 520 tonnes in 1993 and more than 15 000 tonnes in 1999 (Figure 4). These great variations were due to the different effort levels applied by the fleet in this fishing ground, which oscillated between 230 fishing trips (1995) and a maximum of 2 781 fishing trips in 1999.

A sharp increase of landings and exerted effort took place in the last four years before the end of the Agreement, reaching the maximum values in 1999. In fact, such peaks corresponded to an important decrease of the anchovy landings in the Gulf of Cadiz that year.

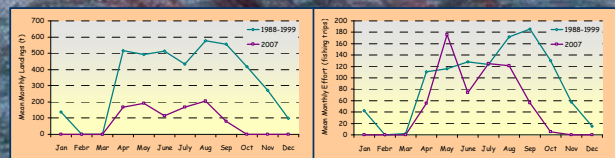


Figure 5.- Spanish anchovy fishery in Atlantic Moroccan waters: monthly evolution of anchovy mean landings (tonnes) and mean nominal species-specific effort (fishing trips with positive anchovy catch). Period 1988-1999 and year 2007.

The fleet dynamics varies through the year. During the period 1988-1999, the higher effort of the fleet targeting anchovy was carried out along the period July-October (maximum average value of 186 fishing trips in September). Higher catches were also obtained during this period, concretely in August and September (peak of 578 tonnes in August). After this peak, landings progressively decreased until the close season (February and March). From April to June, landings oscillated around 500 tonnes, with monthly efforts around 120 fishing trips. The fishing strategy deployed in 2007 has showed some differences because of some punctual circumstances occurring during this year. In this way, higher fishing effort in Moroccan waters was applied in May (176 fishing days), followed by a sharp decrease the following month and a second peak in July and August (around 120 fishing trips). From September onwards, the effort progressively decreased, one month before than in the series 1988-1999. Landings in 2007 showed two peaks (192 and 204 tonnes), which were coincident with the effort peaks in May and August.

LENGTH COMPOSITION OF ANCHOVY CATCHES

The size of the anchovies landed by the Spanish fleet during the analysed period has oscillated between 8 and 18 cm total length. It has been detected a progression to smaller sizes during the period 1988-1999 (Figures 6 and 7). Thus, the mean length in landings has decreased from 15.4 cm in 1989 to 12.8 cm in 1999, before the end of the Agreement. In 2007, the length composition was more similar to that found in the beginning of the series, in 1989, with a mean length of 15 cm.

