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## Fisheries of *Octopus vulgaris* of the Moroccan Mediterranean Coast

RabiaAjana\*, Mohamed Techetach, Younes Saoud

*Applied Biology and Pathology Laboratory, Faculty of Sciences, Abdelmalek Essaadi University, BP.2121, M'hannech, 93002, Tetuan, Morocco*

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**Key words:** *Octopus vulgaris*, Fisheries, Moroccan Mediterranean coast.

### Abstract

The common octopus *Octopus vulgaris* (Cuvier, 1797) is the most important cephalopod in fisheries along the Moroccan Mediterranean coast. The purpose of this study is the fishery management of this species. The monthly landings are analyzed from 2008 to 2015. Data of DML by fishing gear are used to examine the catch composition. The results showed an inter-annual variability in landing. The highest catch rates were obtained from October to December, while during the rest of the year they remained at low levels. Clay pots exploited large individuals than trawlers. We conclude that the spawning period lasts from Spring to Summer where a recovery period should be applied.

\*Corresponding Author: Rabia Ajana ✉ [ajana.rabia@yahoo.fr](mailto:ajana.rabia@yahoo.fr)

## Introduction

The common octopus is an important species in many countries, which supports artisanal and industrial fisheries (Napoleão *et al.*, 2005). It has a high demand and commands high prices. Captured by various methods, in the Mediterranean Sea, most of the landings are due to the fishing activities of coastal trawlers (Belcari and Sartor, 1993), that exploit population living on a soft, sandy or muddy bottom, while the artisanal fishing fleet especially clay pot target octopuses inhabiting rocky substrates (Mangold, 1983). Due to its short life cycle (Mangold-Wirz, 1963), the stock of *O. vulgaris* seems to be affected by environmental variability (Vargas-Yáñez *et al.*, 2009).

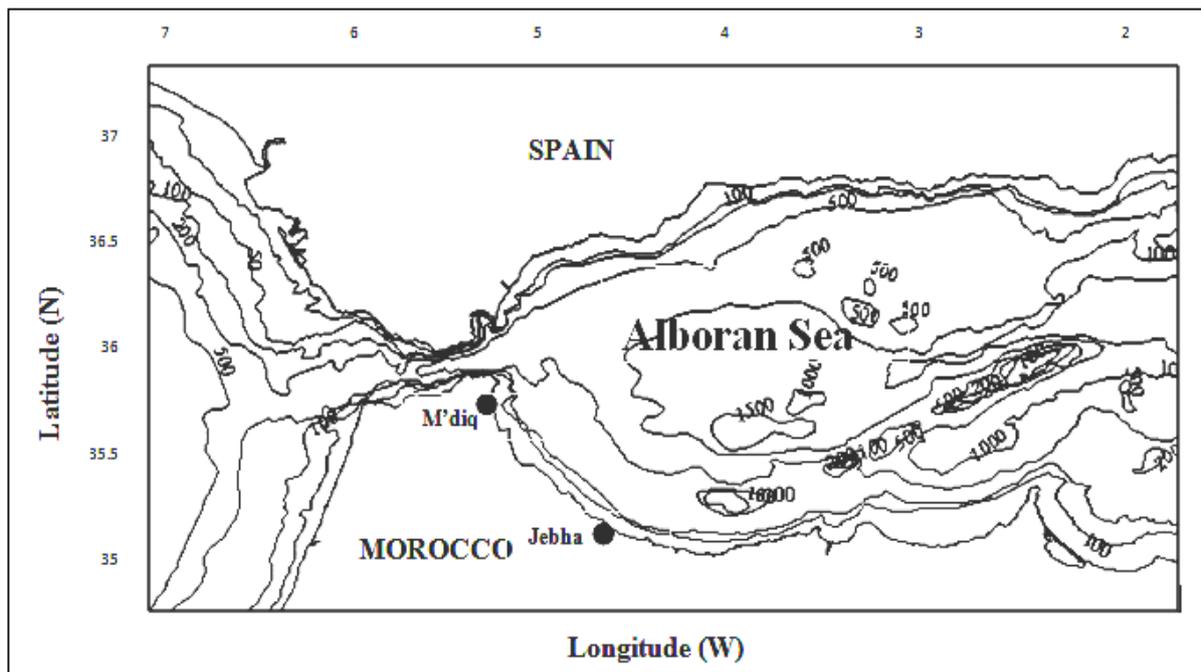
In the Moroccan Mediterranean *O. vulgaris* was also the main fished cephalopod species with an average of catches around 200 t per year between 2008 and 2015 in the port of M'diq (MPM, 2016).

The objective of this work was to understand the abundance and the life cycle of *O. vulgaris* throughout the year by studying their landings.

## Materials and methods

### Study area

The study was carried out in the Moroccan Mediterranean coast located in the Alboran Sea (western Mediterranean). M'diq is the main port where fishing vessels land (Fig. 1).



**Fig. 1.** Map of the area studied (western Mediterranean) showing the position of M'diq port (35.68° N/-5.32° W).

In this area octopuses are caught by trawlers, as well as by artisanal boats using clay pots.

### Fisheries data collection and analyses

Monthly landings from 2008 to 2015 (in tone) (bottom trawl and artisanal fleets pooled) in M'diq port have been used to analyze the fishery pattern. Data were provided by National Fisheries Office of M'diq.

A total of 365 individuals randomly selected were sampled from June 2013 to May 2014 (223 caught by artisanal boats, 142 by trawlers) and the dorsal mantle length (DML) of sampled specimens was studied by fishing gear (trawl and clay pot).

A non-parametric analysis (Kruskal-Wallis test) served to examine the interaction of the two gears based on DML data obtained in different months of

the year. The statistical program used was Statistica 6.0.

**Results and discussion**

M’diqport, is a focal point for the landings of fishing vessels. Octopuses’ catches by trawling dominate the artisanal gears. Sánchez and Obarti (1993) from the Spanish Mediterranean coast reported a high percentage of clay pots catch in the total landing.

The monthly common octopus catches recorded in M’diq port between 2008 and 2015 are as shown in

Fig. 2. There was a strong inter-annual variability in this period with values ranging between 61 and 293 t.

These fluctuations seem to be the results of environmental variability influencing the life cycle of the species (Boyle and Boletzky, 1996; Sobrino *et al.*, 2002; Vargas-Yáñez *et al.*, 2009; González *et al.*, 2011). This seasonality in landings has also been observed in other cephalopod species (Sánchez and Martõân, 1993; Guerra *et al.*, 1994; Pierce *et al.*, 1994).

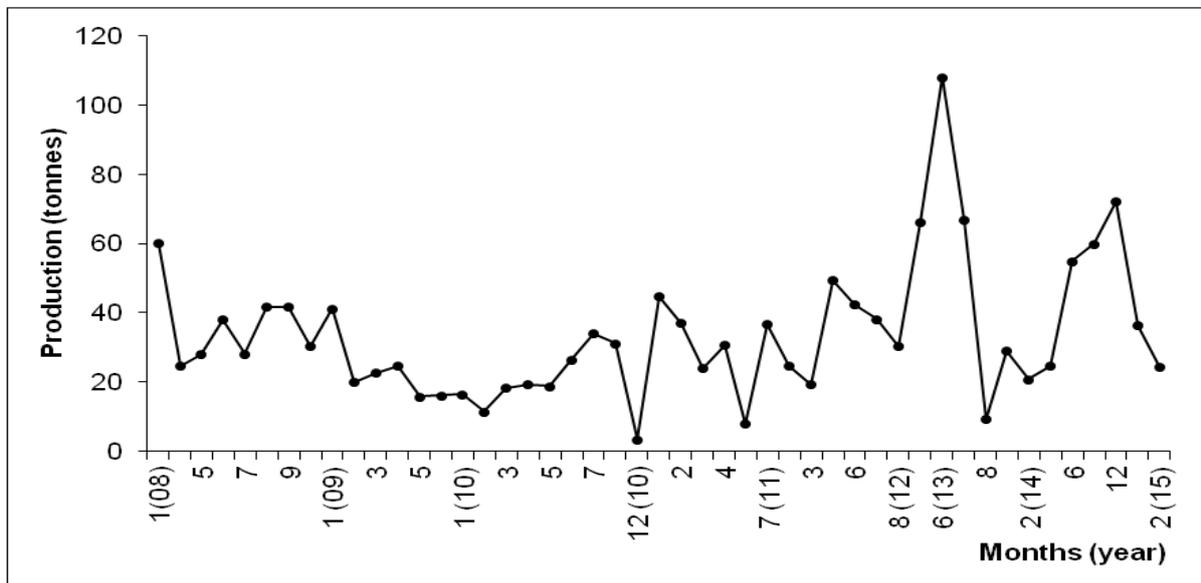


Fig. 2. Monthly evolution of landings of Octopus vulgaris from 2008 to 2015.

However, during the same period Landings of octopuses show a cyclic behavior throughout the year, a notable increase in the mean octopus landings for each month from October to December with maximum peaks recorded in December, whereas low catches were recorded from January to September (Fig. 3).

Vargas-Yáñez *et al.* (2009) reported the same result in northern Alboran Sea which was explained by the recruitment of juveniles that start to increase in size from late autumn. During spring and summer catches decreased, González *et al.* (2011) reported also the same finding which was explain by the spawning period of the species that lasting from spring to

summer, where breeding individuals die. On the other hand, Quetglas *et al.* (1998) observed that the most productive times were in spring and at the beginning of the summer which was explained by the fact that in summer, octopuses disappear progressively from trawling grounds.

*O. vulgaris* is caught by trawlers fishing, as well as by artisanal boats. Most of the artisanal landings are due to clay pots. Monthly changes were observed in average size of the sampled specimens during the whole year.

The mean dorsal mantle lengths (DML) of the octopuses showed that specimens caught by clay pots

are significantly larger than those landed by trawlers (Kruskal- Wallis test:  $H=10.29$ ;  $p<0.05$ ) (Fig. 4). For both type of gear, the small individuals increased in size gradually from December until spring-summer where large specimens dominate. Lack of data from trawl landings in September-October and in March-April was due to the biological recovery periods. Migrations of adult octopus to coastal waters to

reproduction influence the captures: mean DML of individuals caught by trawlers in deep waters are smaller than those caught by clay pots. That reflects different depths at every type of gear work. Clay pots exploit adults' population that migrates to the shallower waters to spawn, while trawlers fish small specimens further from the coast (Guerra, 1997; Quetglas *et al.*, 1998.).

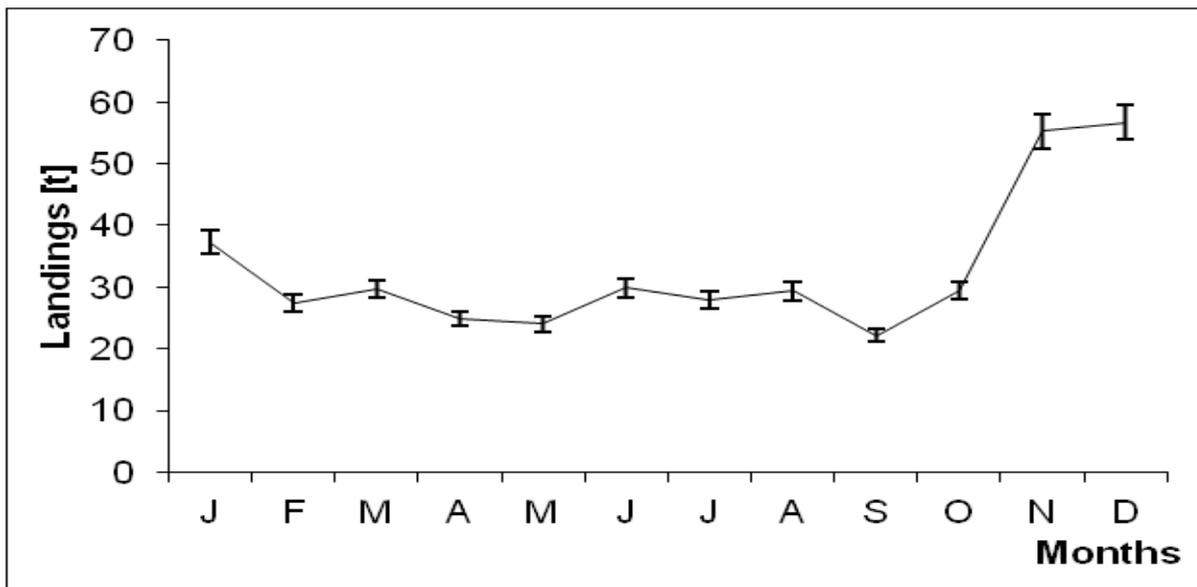


Fig. 3. Average landings ( $\pm$  SE) for each month of *Octopus vulgaris* from 2008 to 2015.

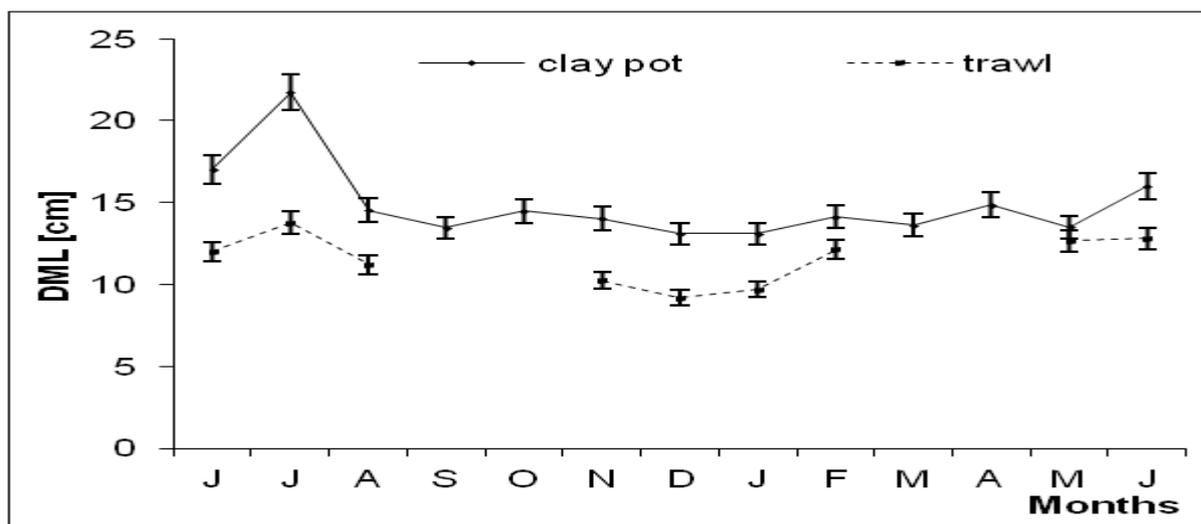


Fig. 4. Mean dorsal mantle length (DML  $\pm$  SE) of *Octopus vulgaris* caught by trawl (broken line) and clay pots (solid line).

In our work, the curve of mean dorsal mantle length by months of trawlers followed the same trend as the artisanal fleet (Fig. 4). Both types of gear exploit

larger specimens in spring-summer. That reflects the spawning period and explains the reproductive cycle of the species.

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