

# DO THE TECHNICAL CHARACTERISTICS OF THE TRAWLERS CONTROL BOTTOM TRAWLING ACTIVITY IN THE GULF OF GABES (TUNISIA)?

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## Abstract

In the Gulf of Gabès, bottom trawling is a highly developed fishery but is still poorly known. The aim of this study was to identify this fishery by determining the technical characteristics of the trawlers, their production, fishing area and target species, using a typological approach based on multivariate analyses of landings data. Four fishing strategies are defined (caramote prawn and fish fishery, fishery of the species destined for exportation -essentially rose shrimp- and non selective fisheries) showing that differences in fishing tactics are mainly due to differences of exploited areas which depend themselves on the technical characteristics of the vessels.

**Keywords:** Fisheries, Gulf Of Gabes, Coastal Management, Gis, Analytical Methods

## Introduction

The Gulf of Gabès is the most important fishing area in Tunisia (south-western Mediterranean Sea) and bottom trawling is the most predominant fishing activity in this area. Fisheries management not only requires the knowledge of the biological and the dynamics parameters of the resources but also to identify the characteristics of the fleets. Many authors have tried to establish a typology of the trawling activity ([1], [2],[3]), but in this region, it is still poorly known. The purpose of this study is to identify the effects of the technical characteristics of the fleets and the prospected areas on the trawlers productions.

## Material and methods

Two data sets were available: one from national statistics of Tunisia, and the other one from individual on-site interviews of the trawlers captains in the Sfax harbour. The data were collected during 3 months from February to April 2008, and were related to the technical characteristics of the boats. The quantity of the species caught was also estimated. A typology of the fleet was used to identify several métier (a gear associated with a fishing practice) to explore potential relationships between the technical characteristics of the trawlers and the species caught. The methodology employed to reach these objectives consist in multivariate data analyses which are more and more employed in the fisheries sciences ([4],[5]). Cartographic representations of the métiers were also performed using a Geographical Information System (G.I.S).

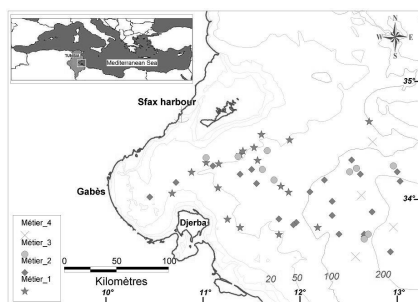


Fig. 1. Activity areas of the different trawler groups operating in the gulf of Gabès

## Results and Discussion

**Fleet structure and exploited species.:** The data collected by the Statistical Service of the General Direction of Fishing and Aquaculture show an increase of engine power of the trawlers (and indirectly of fishing effort) in the last decades. A total of 88 trawlers were prospected (33% of the trawlers of the area). The average total length, GTR and engine power were estimated and the main exploited species were characterised. **Typology of the active fleet and activity areas of each métier.** The typological analysis of the trawlers showed the existence of 4 fishing strategies (métier) (Table 1) and the activity areas of the trawlers for each métier were represented using a G.I.S.(Fig. 1). The first target caramote prawn and cuttlefish. This métier is practiced by old trawlers with low engine power and low autonomy at sea. The second métier is composed by the youngest and less selective trawlers; involving an important number of sailors. The third is fish fishing. The units belonging to this group

have the best technical characteristics (big boats with highest engine power and gross tonnage) and operate at deep sea and their interest is to prolong duration of the outing to take advantage of the trip. The fourth métier is fishing for export (species like rose shrimp, common octopus, musky octopus, and european squid). The units linked to this activity are the longest trawlers with an important crew number. They are the freezer trawlers. This type of activity requests big units and an important number of sailors to carry out the operations of sorting, conservation and packaging of the species caught. It is a new fishery and results from diverse economic (poor profitability of the traditional fisheries) and biological factors (weak fish production due to over exploitation of the stocks).

Tab. 1. Description of the four métiers in regard with the technical characteristics of the boats and the landed species

Métier	N°	Test	characteristics				Technical variables
			Year	Netting variable	Species	Year	
1	20	0.1 EPI-400 HP	0.50	Common cuttlefish	2.01	Trawler age	
			2.38	Caramote prawn	2.10	Number day in haul	
			0.3	Rose shrimp	4.72	Crew number	
2	40	0.2 EP-800-600HP	0.50	Fish	4.85	Length	
			4.35	European squid	3.57	Engine power	
			0.1	Caramote prawn	2.75	Trawler age	
			0.1	Common cuttlefish	2.94	Trawl number	
3	12	0.4 EPI-800 HP	0.50	Fish	5.37	Length	
			3.00	European squid	3.90	Number day in haul	
			0.3	Rose shrimp	3.16	Crew number	
4	0	0.3 EP-800-600HP	0.48	Common octopus	2.63	Length	
			4.84	European squid	3.90	Number day in haul	
			3.24	Rose shrimp	3.16	Crew number	

## Conclusion

This study indicates that the technical characteristics of vessels command the fisheries strategies and therefore the exploited species. The role of the technical parameters in the identification of the different métier has not been mentioned in the national studies implying a typology of the trawlers. The most mentioned factors are the seasonality ([6]) and the fishing zone ([7]). The results of the two approach (cartographic and statistic) show a good concordance, might be a good basis for the management of the fishing activity in the gulf of Gabès.

## References

- 1 - Taquet M., Gaertner J.C., Bertrairid J., 1997, Typologie de la flottille chalutière du port de Sète par une méthode de segmentation. *Aquat. Living Resour.* 10, 137 – 148.
- 2 - Jiménez M.P., Sobrino I., Ramos F., 2004, Objective methods for defining mixed-species trawl fisheries in Spanish waters of the Gulf of Cádiz. *Fish. Res.* 67, 195–206.
- 3 - Campos A., Fonseca P., Fonseca T., Parente J., 2007, Definition of fleet components in the Portuguese bottom trawl fishery. *Fish. Res.* 83, 185 – 191.
- 4 - Pelletier D., Ferraris J., 2000, A multivariate approach for defining fishing tactics from commercial catch and effort data. *Can. J. Fish. Aquat. Sci.* 57 (1), 51 – 65.
- 5 - Verdoit M., Pelletier D., Bellail R., 2003, Are commercial logbook and scientific CPUE data useful for characterizing the spatial and seasonal distribution of exploited populations? The case of the Celtic Sea whiting. *Aquat. Living Resour.* 16, 467 – 485.
- 6 - Missaoui H., Jabeur Ch., Gobert B., Jarboui O., Elabed A., 2000, Analyse typologique de la flottille chalutière du golfe de Gabès (Sud Est Tunisie). *Bull. Inst. Scien. Tech. Mer Salammbô* 27, 15 – 26.
- 7 - Abdesselem F., M'Timet M., Jarboui O., 1998, La pêche au chalut benthique sur les côtes nord de la Tunisie. *Cah. Option Mediterr.* 301 – 308.