Deep-sea Chondrichthyes caught in an experimental fishing survey off the Canary Islands (NE Atlantic Ocean)

Mafalda Freitas 1,4, Luisa Costa1, João Delgado2, S. Jiménez3, A. J. González2 and Viriato Timóteo3

1 Estação de Biologia Marinha do Funchal, Cais do Cacimba, Gorgulho, 9000-107 Funchal, Madeira, Portugal. Corresponding author e-mail: mafalda.freitas@cm-funchal.pt
2 MARE – Marine and Environmental Sciences Centre, Estação de Biologia Marinha do Funchal, Cais do Cacimba 9000-107 Funchal, Madeira, Portugal.
3 Dirección de Servicios de Investigación y Desarrollo Pesquero, Estación de Pesca, 9064-527 Funchal, Madeira, Portugal.
4 Museo de Ciencias Naturales de Tenerife, 38015 Santa Cruz de Tenerife, Spain.
5 Grupo de Ecología Marina Aplicada y Prospección, Universidad de Las Palmas de Gran Canaria, Departamento de Biología, Campus de Tafira, Las Palmas de Gran Canaria, 35017 Las Palmas, Spain.

INTRODUCTION
There is a long tradition in the deep-sea fishery of the bathypelagic black scabbard-fish, Aphanopus carbo and A. intermedius, in Portugal mainland and in the Madeira archipelago (Delgado et al., 2013). In Madeira, this fishery is performed with drifting longlines, set between 800 and 1200 m of depth, on the insular slopes and nearby seamounts. This is one of the oldest known fisheries in the world targeting a deepwater resource (Leite, 1988).

Recently, Portugal and Spain signed an agreement to study the black scabbard-fish in the Canary Islands, using commercial fishery vessels from Madeira in an experimental survey. The main objectives of the experimental survey were to obtain indications about the relative abundance of the black scabbard-fish in the Canary Islands and to study the by-catch of this fishery.

MATERIAL AND METHODS
In March 2009 an experimental fishing survey was carried out off the Canary Islands between 1000 and 1200 deep, with the black scabbard-fish drifting longline – Madeiran type, on-board the black scabbard-fish vessels F/V Pico Dourado and F/V Pico Alto. In each fishing set both vessels used two separate long lines, one with around 500 hooks and the other with around 5000 hooks.

Hauls were done along the Islands of Tenerife, La Gomera, La Palma, Fuerteventura and El Hierro, in a total of 20 hauls (Fig. 1). The bait used was the neon flying squid Quedanus mystes. Shark specimens caught as by-catch were all sampled. All individuals were measured, weighed and the sex registered.

Several voucher specimens from all species captured were deposited as reference collections in the Natural History Museum of Funchal (MMF).

This survey was carried out inside the Canary IZE, in the framework of a fisheries agreement between the Macaronesian archipelagos.

RESULTS
A total of 436 mesopelagic chondrichthyan specimens were caught and sampled at laboratory, being identified 9 species belonging to 5 families (Tab. 1). The leafscale gulper shark (Centrophorus squamosus) (n=129) and roughskin dogfish (Centroscymnus owstonii) (n=121) were also well-represented in the captures; however the fact of being separately captured by one or another fishing vessels may reveal differences in depth distribution or characteristics in the fishing gear (notably the type of hook). The capture of the other five chondrichthyan species could be considered as anecdotic or incidental. (Tab. 1).

Present results were compared to those obtained from the by-catch of the black-scabbard fishery off Madeira (Bordalo-Machado et al., 2009). No significant differences in species composition were observed, except for the absence of Centroscymnus owstonii and Deania calcea off the Canary Island.

Landings of the leaf-scale gulper shark C. squamosus, the most captured species within the by-catch, over the past decade peaked in 2003 (3042 tonnes) and have declined to 243 tonnes in 2009. In Portugal, based on FAO catch data, is landed on an average 893 tonnes per year from 2000 to 2009. In contrast, short time series of CPUE available for the western coast of Portugal seems to remain stable (Gibson et al., 2008). Given that this species is highly vulnerable to depletion, evidence for steep declines in several areas of its range and continued fishing pressure remain in this region, it has been assessed as endangered in the Northeast Atlantic. It was recently listed on the OSPAR (2008) List of threatened and/or declining species and habitats (Gibson et al., 2008).

Accordingly to these results and concerns, further studies should be conducted in order to evaluate the real impact of this fishery on the north-eastern Atlantic population(s) of the leaf-scale gulper shark, but also addressing technological developments related to the fishing gear tending to minimize their captures.

ACKNOWLEDGEMENTS
The authors are indebted to Maurer and Cies of the FV Pico Dourado and FV Pico Alto for all their work done at sea. Thanks are also due to the technicians of the Estación de Biología Marinha do Funchal, Dirección de Servicios de Investigación de las Pescas, Instituto Español de Oceanografía and Instituto Canario de Ciencias Marinas who have collaborated at sea and in the laboratory.

REFERENCES

Table 1 – Species composition in numbers (n) of Chondrichthyes caught by the black scabbard-fish fishery vessels Pico Dourado and Pico Alto.

Table 2 – Descriptive statistics of length, weight, sex proportion variables on sampled specimens.

Figure 1. Map of the Canary Islands showing set locations along the Islands of Tenerife, La Gomera, La Palma, Fuerteventura and El Hierro (A – Fishing set by Pico Dourado; B – Fishing set by Pico Alto).