

**«TREASURES OF THE DEEP ATLANTIC»  
AN EXHIBITION UNVEILING THE WONDERS OF THE  
DEEP-SEA AROUND MADEIRA (NE ATLANTIC OCEAN)\***

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With 10 figures and 1 table

*ABSTRACT.* In the present paper the authors give an account on a didactic activity never done before in Madeira, aiming to unveil the main aspects of the deep Atlantic Ocean, including research done in Madeira and the main threats to this particular ecosystem. This activity was presented as a multimedia exhibition that was shown at all the municipalities of the islands of Madeira and Porto Santo and was attended by more than 226,000 people.

*RESUMO.* No presente trabalho é dada a conhecer uma atividade didática inédita na Madeira, que visou dar a conhecer ao grande público as principais características do mar profundo, na área do Oceano Atlântico, incluindo a investigação que se realiza na Madeira e as principais ameaças que impendem sobre este ecossistema. Esta atividade assumiu a forma de uma exposição multimédia itinerante, que percorreu todos os concelhos da Região Autónoma da Madeira e que foi vista por mais do que 226.000 pessoas.

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## INTRODUCTION

In the framework of the PESCPROF programme (Deep-sea resources of the eastern central Atlantic), three research projects were carried out between 2003 and 2008 with the principal goal of exploring the deep-sea biodiversity off the Azores, Madeira and the Canary Islands between 250 m and 2,500 m, and finding new alternative fishery resources.

In this context, a multimedia exhibition entitled «Treasures of the deep Atlantic» was built in order to explain, not only the deep-sea and some of its characteristics, but also to unveil the scientific results of these projects targeted for the public in general.

Besides revealing the mysteries of the deep ocean, this exhibition also showed alternative or complementary fishery resources studied in the course of the PESCPROF programme, providing information towards a responsible and sustainable exploration of these project series.

Several other initiatives were also developed in order to publicize the PESCPROF programme and to educate the public. They included an Internet Web Page ([www.pescprof.org](http://www.pescprof.org)), posters, leaflets and didactic games for students of different school levels.

The social impact of this exhibition is presented herein.

## MATERIAL AND METHODS

The multimedia exhibition «Treasures of the deep Atlantic» was prepared so as to be easily transported and mounted. It is made of 8 large panels. In order to stimulate children and adults' curiosity, the information on the panels is shown at two different levels, the lower one a cartoon, is dedicated to the young users and the higher, more elaborate, dedicated to elder people.

In addition to the static panels, several multimedia/interactive elements were used, *i.e.* a plankton microscopic observation point, a weighing scale that associates body weight with pressure/depth, the James Cameron's film "Aliens of the Deep" (Walt Disney Pictures), a slide show with photographs taken during the research activities and illustrating the deep-sea biodiversity of this area, and finally the bottom and semi-floating selective traps used for the fishery of the deep-sea red crab and the striped soldier shrimp, respectively.

Aimed at the under 11 age group, a small performance, "The Treasures' Trunk", was created. In a funny way, children learned about the main adaptations of deep sea organisms which allow them to live in such an extreme environment.

The exhibition was always accompanied by two monitors, whose main task was to take the various visitors on guided tours, adapted to different educational backgrounds.

Profiting from excellent facilities available in the archipelago, the exhibition was exhibited in all municipalities of Madeira and Porto Santo (Fig. 1), from June 2007 until November 2008. At each location the exhibition stayed for periods ranging from 1 to 2 weeks.

The exhibition was located at the following venues: major local schools, shopping centres, culture halls and hotels (4 and 5 stars).

In order to evaluate the impact and interest of this exhibition on local populations and tourists, as well to assess the overall type of visitor, a written inquiry was carried out (Annex 1). The visitors were randomly selected and they filled out a questionnaire on location.

For the purpose of the present analyses, the levels of education of visitors were divided as follows: College: Level 1, children 6 to 9 years old; Level 2, 10 to 11 years old; Level 3, 12 to 14 years old; High School; University degree; Other: outside the routine teaching system.



Fig. 1 - Map of Madeira and Porto Santo showing the places where the exhibition was presented indicating the number of visitors.

## RESULTS

### Attendance

In total, the exhibition was seen by 226,227 persons in the 11 municipalities of Madeira and Porto Santo (Fig. 1). The highest number of visitors (76%) was in Funchal, the capital city of Madeira.

The highest rate of attendance was in shopping centre (93,5%). In contrast in those premises the number of guided tours was lowest (0.4%) (Table 1). Culture halls and schools held the highest number of students in guided tours (98%).

The educational level of attendants (Fig. 2) was as follows: 35% had a university degree, 30% a high school degree, and 32% were still at college in levels 1 to 3.

**TABLE 1** - Category of places where the exhibition was displayed with total number of visitors and number of visitors in guided tours.

	No. of displays	Visitors	Visitors in guided tours
Schools	5	1965 (0,9%)	1965 (44,5%)
Shopping Centre	3	211452 (93,5%)	18 (0,4%)
Culture Halls	20	12347 (5,5%)	2359 (53,4%)
Hotels	4	463 (0,2%)	78 (1,8%)
<i>Total</i>	<b>32</b>	<b>226227</b>	<b>4420</b>

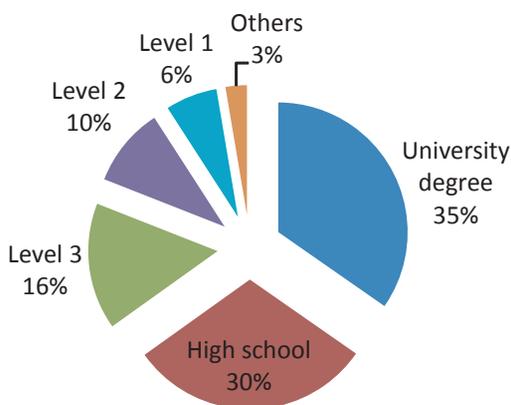


Fig. 2 - Educational level of the persons who have seen the exhibition.

### Satisfaction

A total of 532 questionnaires were completed satisfactory, 381 by adults and 151 by individuals under eighteen. Females made up 54% of the sample.

According to the inquiries, visitors became aware of the exhibition in the following major ways: recommended by other visitors (33.8%) and other (flyers, posters, outdoor advertisement, etc.) (44.1%) (Fig. 3).

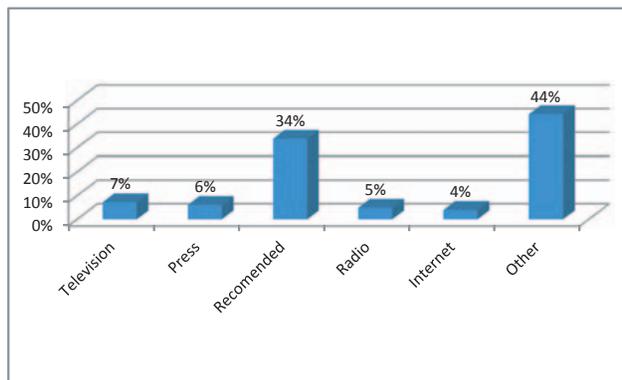


Fig. 3 - Sources of information visitors have used to become aware of the exhibition.

Within questioned about the theme of the exhibition, 66% of visitors answered that it was very interesting and 30% that it was interesting. Only one visitor considered it of no interest (Fig. 4).

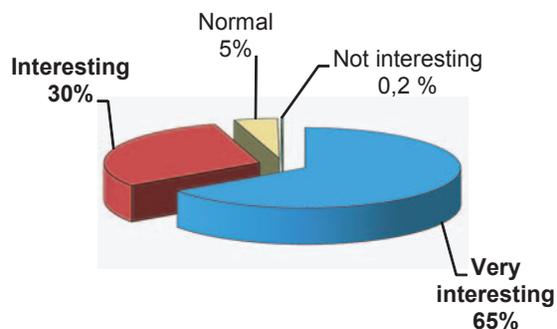


Fig. 4 - Opinion of visitors about the contents of the exhibition.

Regarding the amount of text read by visitors (Fig. 5), most of the people read more than half (49%) of the text written in the panels.

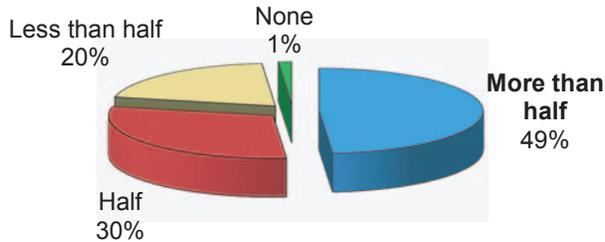


Fig. 5 - Amount of text read by attendants.

Of the multimedia and interactive elements present in the exhibition, the movie, the plankton microscopic observation and the weighing scale were the most popular (30.5%, 23.3% and 20.5%, respectively) (Fig. 6).

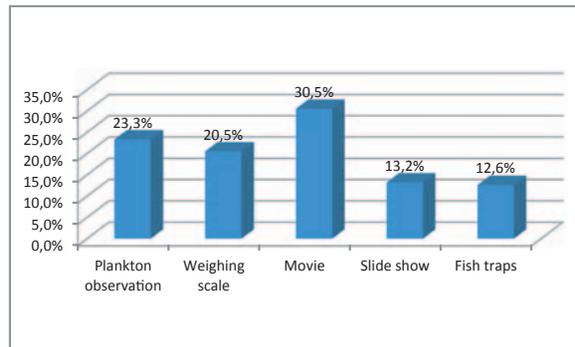


Fig. 6 - Interest on the multimedia and interactive elements of the exhibition.

Whilst planning the exhibition, the question as to whom it should be aimed at, was recurrent. It was therefore judged important to hear public opinion on this issue and to ascertain if the exhibition was aimed at the right public. 79% of the inquired visitors expressed the opinion that the exhibition was for all kind of audiences (Fig. 7).

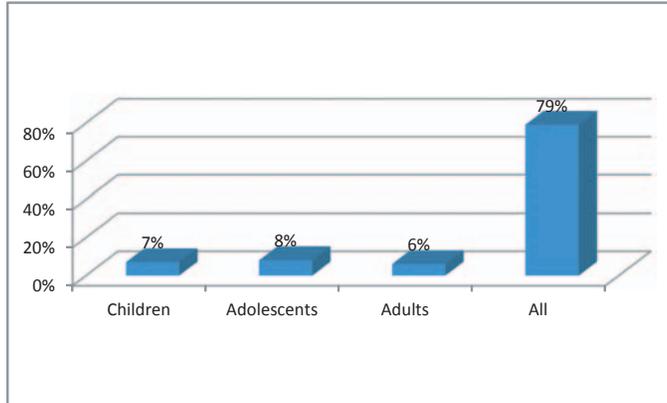


Fig. 7 - Opinion of visitors about the target audience.

Of those questioned, 96% regarded the PESCPROF programme as very interesting or interesting (Fig. 8).

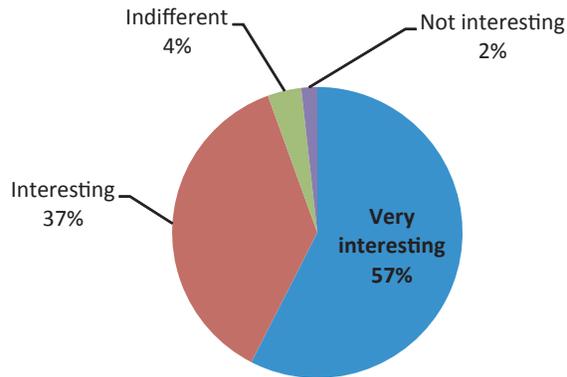


Fig. 8 - Opinion of visitors about the PESCPROF programme.

When asked if before seeing the exhibition they knew any of the three deep-sea species dealt with specifically in the programme, the black scabbardfish, *Aphanopus carbo* and *A. intermedius*, the deep-sea red crab, *Chaceon affinis*, and the striped soldier shrimp, *Plesionika edwardsii*, 94% of the visitors choose the black scabbardfish (Fig. 9).

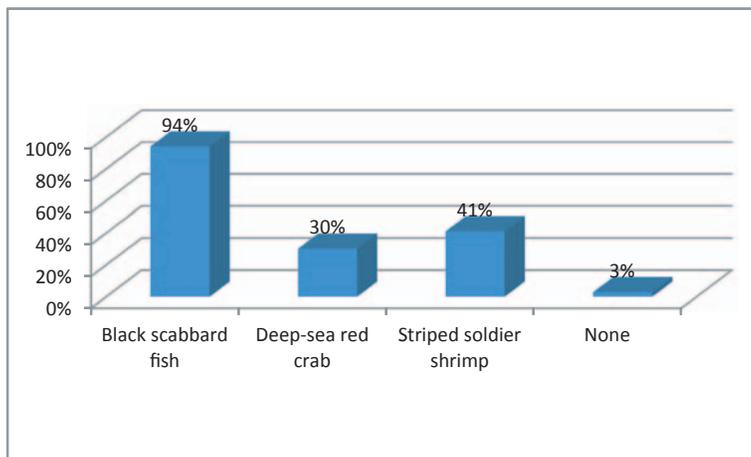


Fig. 9 - Previous knowledge about the three target deep-sea species: black scabbardfish, deep-sea red crab and striped soldier shrimp in Madeira Island.

When visitors were questioned about their opinion as to the importance of the PESCPROF projects to the local society and economic development, 96% said the projects were very important (Fig. 10).

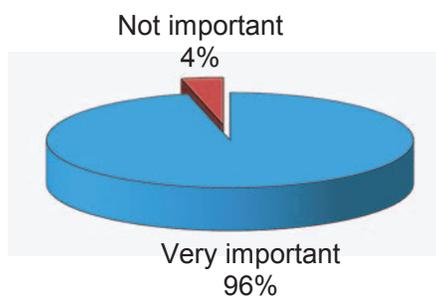


Fig. 10 - Opinion of attendants about the importance of PESCPROF projects to the local society and economic development.

## DISCUSSION AND CONCLUSIONS

Taking into account that in 2009 the population of the archipelago of Madeira was estimated at 247,399 (DRE, 2010), the attendance of the exhibition (over 226,000) was extremely satisfactory. This of course was mainly due to the fact that the exhibition took place in the two most popular shopping centres of the two main urban areas of Madeira (Funchal and Caniço).

The average education level of the visitors was high, with 65% having a high school degree or higher. This figure is clearly higher than the estimated for the whole population of Madeira (28%) (CIES, 2010), meaning that this type of initiatives tend to attract people with higher education.

Person-to-person recommendation and the distribution of flyers, posters and others in public places revealed high publicity efficacy. During the time the exhibition was in place, social networking in the Internet was not yet used as it is now, which may explain such a low penetration (4%).

More than half of the visitors found the exhibition very interesting and overall 95% was pleased with it. This means that the exhibition design was adequate for the target public. This conclusion is further reinforced by the results of the question relating to the amount of text read. In this case, 69% of the visitors declared that they had read half or more of the texts from the panels in the exhibition.

Not surprisingly, amongst the multimedia/interactive elements on exhibition, the movie was the most popular, followed closely by the plankton observation point and the weighing scale. The high quality and the theme of David Cameron's movie make it an insurmountable attraction. However, the plankton observation attendance proves that people are also attracted by the unknown and the weighing scale exerts the natural curiosity of people for knowing their body weight, thus justifying 20.5% preference.

The exhibition "Treasures of the Deep Atlantic Ocean" was designed for a general audience and in this respect it hit the target. 79% of the questioned visitors considered it very suitable for a general public.

Taking into account the level of education of the questioned visitors, it is not surprising that 94% considered the PESCPROF programme as "interesting" or "very interesting" and that 96% considered it very important for the local society and economic development.

The black scabbardfish being a very popular fish in Madeira and one of the *ex-libris* of Madeira's cuisine, it was not a surprise that 94% of the people questioned already knew of it. This figure is much lower for the deep-sea red crab and the striped soldier shrimp, which can be justified because these two species have started being publicized only since the beginning of the programme. This may also indicate that the visitors had already some knowledge about the deep-sea fauna of Madeira, which is again in accordance with the average education level.

The exhibition “Treasures of the Deep Atlantic Ocean” was a pioneering and innovative exhibition. The transmission of the message, namely the discovery and study of the deep-sea species in the area of Madeira, between 200 and 2,500 meters of depth, as well as the identification of potential fishing resources, was successfully achieved.

Written evaluation by a random section of the visitors has proven to be an effective tool to assess the degree of satisfaction of the attendants and consequently to indirectly assess the penetration of the information. The analysis of the results revealed a clear high degree of satisfaction amongst the visitors, which in addition to the large public attendance, made this exhibition a very successful initiative.

In 2009 a new project called MARPROF (PCT MAC 2007-2013, MAC/2/065) started. Among other objectives, an emphasis is put on the valorization of the new deep-sea fishing products already discovered during the PESCPROF projects. The exhibition «Treasures of the deep Atlantic» has been adapted, in order to encompass the gastronomic valorization of the new deep-sea fishing products. The contents of the exhibition will also contribute to a better understanding of the biodiversity of the deep waters of Macaronesia, and to the assessment of the potential of new sustainable alternatives to traditional fisheries resources. Ultimately the valorization of these new high-quality regional products will enlarge the local culinary offer, in an era of great demand for healthy and sustainable-exploited sea products.

#### ACKNOWLEDGEMENTS

The authors wish to thank Arturo Boyra and Bruno Lanzarote for useful ideas during the design phase of the exhibition and Luisa Costa, Luis Costa, Filipe França e Alan Nóbrega for their availability to help in the logistics of the translocation of the exhibition, whenever it was necessary. Thanks are also due to the Mayors of the 11 municipalities of Madeira and Porto Santo, the persons in charge and staff of all other institutions and public areas that have accepted to receive the exhibition and to Porto Santo Line and Binter Canarias for help in the transportation of the exhibition. The authors are also indebted to Francis Zino for useful comments and improvement of the manuscript. The projects PESCPROF-1 (MAC/4.2/M12), PESCPROF-2 (03/MAC/4.2/M8) and PESCPROF-3 (05/MAC/4.2/M11) were co-funded by the FEDER in the framework of the EU INTERREG III-B Programme. The MARPROF project (MAC/2/065) is being co-funded by the EU Transnational Cooperation Programme Madeira, Azores and the Canary Islands (PCT MAC 2007-2013).

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