

Stock Annex: Blue jack mackerel (*Trachurus picturatus*) in Subdivision 10.a.2 (Azores grounds)

Stock specific documentation of standard assessment procedures used by ICES.

Stock:	Blue Jack mackerel
Working Group:	Working Group on Anchovy and Sardine and Southern Horse Mackerel (WGHANSA)
Created:	
Authors:	
Last updated:	June 2015
Last updated by:	Dália Rei

A. General

A.1. Stock definition

The blue Jack mackerel, *Trachurus picturatus* (Bowdich 1825), has a broad geographical distribution within the Eastern Atlantic waters and can be found from the southern Bay of Biscay to southern Morocco, including the Macaronesian archipelagos, Tristan de Cunha and Gough Islands and also in the western part of the Mediterranean Sea (Smith-Vaniz, 1986).

The *T. picturatus* is the only species of genus *Trachurus* that occurs in the Azores region (Northeastern Atlantic). It is a pelagic species found around the islands shelves, banks and sea mounts up to 300 m depth. However, a different size structure was observed between islands shelf and offshore areas. The island shelf areas seems to function as nursery or growth zones, while the seamount/bank offshore areas as feeding zones where adults predominate (Menezes *et al.*, 2006).

A.2. Fishery

In the Azores, the *T. picturatus* is exploited by different fleets and métiers. The main catches are those of the artisanal fleet that operates with several types of surface nets, the most important being the purse-seines, and bottom longline. Purse-seiners usually target juveniles in island shelf areas (Figure 1), while bottom longliners target adult specimens in seamounts areas (Figure 2, left panel). Purse-seines are also used by the tuna bait boat fleet, which targets the *T. picturatus* to be used as live bait for tuna (Figure 2, right panel). The Blue Jack mackerel is also a very popular species among the recreational fisherman that fish along the coast of all islands.

The *T. picturatus* landings were considerably high during the 1980s, however changes in the local markets lead to a strong reduction in the catches afterwards. This reduction was also accompanied by a sharp decrease in the fleet targeting small pelagic fishes. Since this period, the catches maintained at a low level due to a voluntary auto regulation adopted by the fishermen associations. Despite this reduction in the landings, this fishery still has a strong impact on some fishermen communities, which directly depends on the income of this fishery.

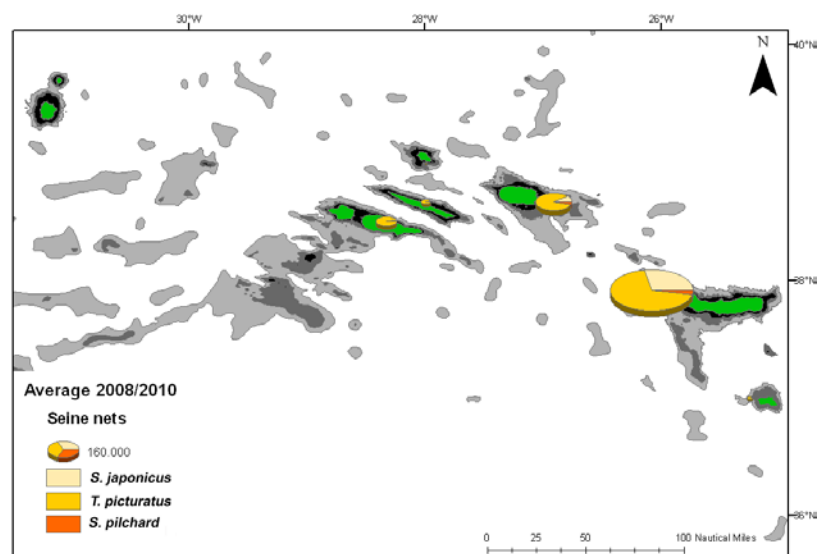


Figure 1. Geographical distribution of the catches of small pelagics by the artisanal purse-seine fleet in the Azores.

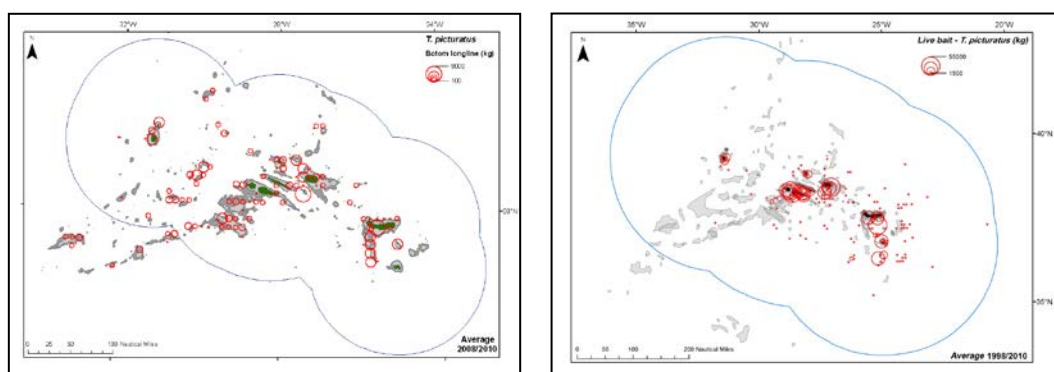


Figure 2. Geographical distribution of the catches of horse mackerel by the longline fleet (left panel) and the tuna baitboat fleet (right panel) in the Azores (average 2008–2010.)

The artisanal purse-seine fleet is composed by small open deck vessels, mostly with less than 12 meters of length. The composition of this fleet, classified in three length categories (LOA) as showed in Figure 3, presented a sharp decrease in the number of vessels during the exploitation period considered, and has remained stable in the recent years. The demersal fleet, composed of vessels using longlines and a variety of handlines, catch blue Jack mackerel, mostly as bycatch, in the multispecific demersal fishery. One other important component of the surface fishery is the tuna baitboat fleet that also uses purse-seines to catches Blue Jack mackerel to be used as live bait for tuna. The variability of the catches from these fleets reflects also the availability of tuna in the Azorean area in each year.

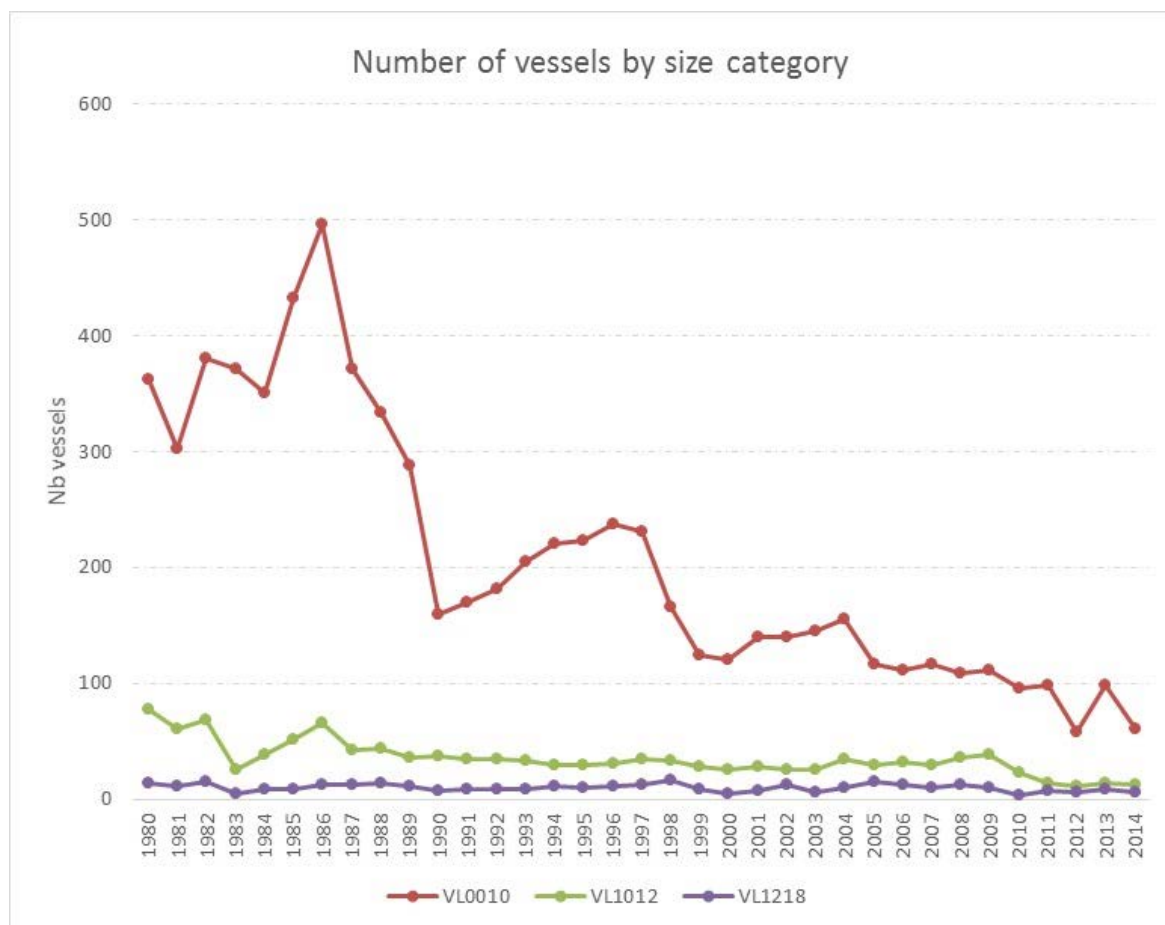


Figure 3. Number of vessels, by size category, using purse seines for Blue Jack mackerel (VL0010 – vessel length between 0 and 10 meters; VL1012 – vessel length between 10 and 12 meters; VL1218 – vessel length between 12 and 18 meters).

A.3. Ecosystem aspects

Blue Jack mackerel is a pelagic small predator which diet is mainly composed by phytoplankton and zooplankton. It is a prey species for other pelagic and demersal species and also for sharks, rays, cetaceans and seabirds. Their school behaviour and availability in Azorean waters turned this species susceptible to be preyed by several species and it has been found to be the main food item of several oceanic seabirds species (Paiva *et al.*, 2010; Xavier *et al.*, 2011), yellowmouth barracuda (Barreiros *et al.*, 2002) and silver scabbardfish (Gomes *et al.*, 1998). There are also other species feeding on blue Jack mackerel despite the reduced importance on their diets, such as the case of the tope shark (Gomes *et al.*, 1998), the conger eel (Gomes *et al.*, 1998), the thornback ray (Gomes *et al.*, 1998) and the squids (Guénette and Morato, 2001). The dependence of several species on blue Jack mackerel has several implications, as it is an important commercial species both for human consumption and for live bait in tuna fishing. Several studies illustrated the importance of the blue Jack mackerel, as other small pelagic species, in structuring marine ecosystems in particular across seamount systems in which they play key roles.

B. Data

B.1. Commercial catch

The Blue Jack mackerel is mostly landed by the artisanal fleet, using purse-seines. The fleet segments that use handlines and bottom longlines also catches Blue Jack mackerel, but the catches are only partially landed, since an important part of their catches is used for bait in the demersal species fishery. Historic landings (1980–2014) of Blue Jack mackerel in the Azores (Figure 4) only includes catches from the artisanal purse-seiner fleet and vessels that uses handlines and bottom longlines.

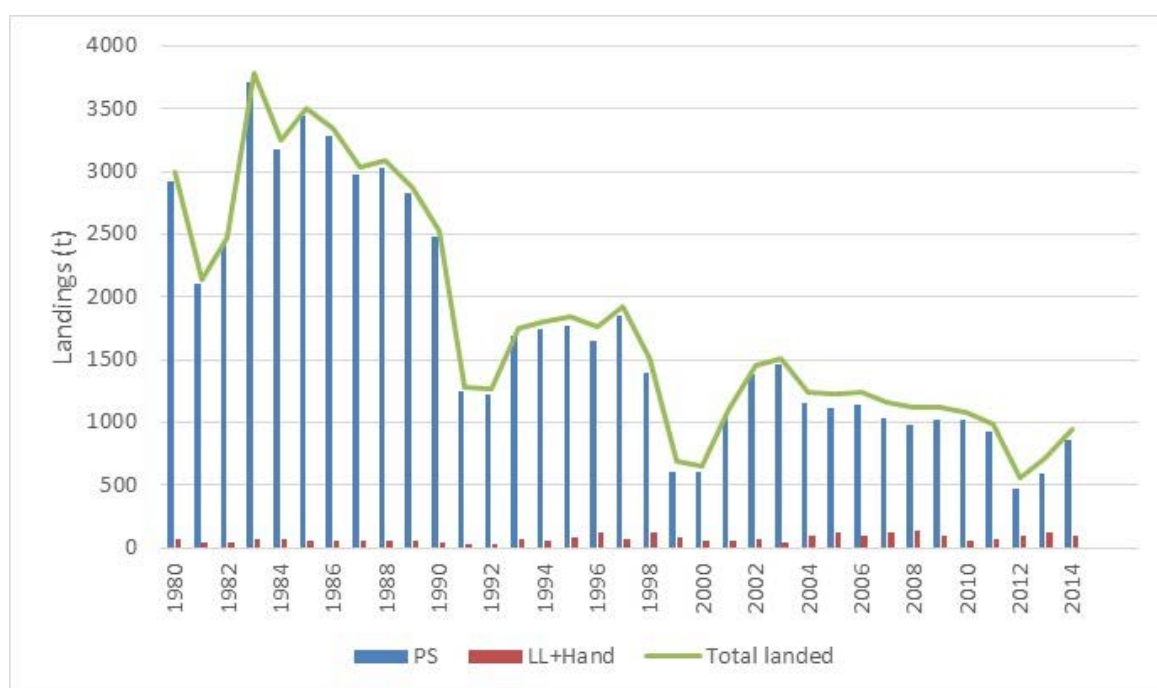


Figure 4. Historic landings of blue Jack mackerel in the Azores. (PS – Purse-seiners; LL+Hand – Longliners and handlines).

The catches made with purse-seines by the tuna baitboat fleet that use Blue Jack mackerel as live bait, are not landed. Two sources of data are used to estimate the Blue Jack mackerel catches from the tuna fleet: information from the logbooks and by the tuna observer programme. The tuna observer programme targets a minimum annual coverage of 50% of the tuna trips and catches.

The discards observer programme for the longline fleet contributed for the estimation of Blue Jack mackerel discarded or used as bait in those fisheries. The programme showed that discards were minimal for this species but a relevant amount was kept onboard and used for bait. Those amounts are estimated using the results of the discards programme and data collected by interviews to all sampled vessels at unloading.

The auto regulation adopted by the fishermen associations for the artisanal purse seine fleet results in some unloaded fish removed from the market, i.e. prevented from being sold at the auction market, the so called purse-seine withdrawn. These amounts should be communicated by the fishermen associations to the administration, but no information is available for 2012 and 2013. For 2014 only partial information is available.

The last component of catches considered was the recreational fishery; once this is very appreciate by the general population. This value is estimated with information collected by a survey project and by the nautical sports clubs in the Region.

Size frequencies for the Blue Jack mackerel caught in the Azores are available since 1980 for the two main métiers involved in the fishery, artisanal purse-seiners and longliners. The size distribution (catch at size) of the landings of blue Jack mackerel derived from the samples collected at the market and by on-board observers. The two main fisheries target on different size categories, the surface fleets catches the juvenile fraction of the population, while the longliners target the adults.

The catch-at-age was estimated using the parameters of the growth equation in a slicing procedure applied to the catch-at-size data.

B.2. Biological

The blue Jack mackerel (*Trachurus picturatus*) is one of the species included in the Data Collection Programme in Azores and consequently its landings are subject to regular sampling. The biological data available includes length, weight, age and maturity.

The length–weight relationships were calculated from 3372 specimens, separately for males and females and for both sexes. The estimated parameters of the fork length vs. total weight relationship are given in Figure 5.

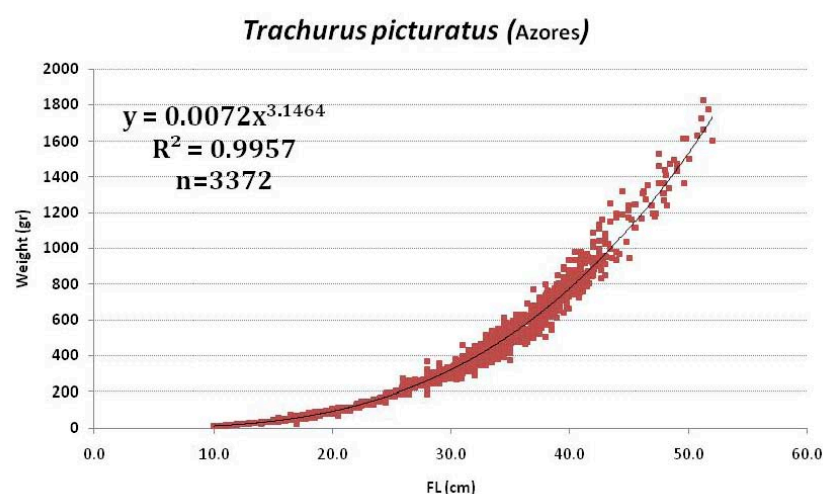


Figure 5. Length–weight relationship for the blue Jack mackerel (*T. picturatus*) from the Azores.

The logistic curve fitted to the proportion of sexually mature blue Jack mackerel estimated the mean length at sexual maturity at 28.5 cm of fork length, as showed in Figure 6.

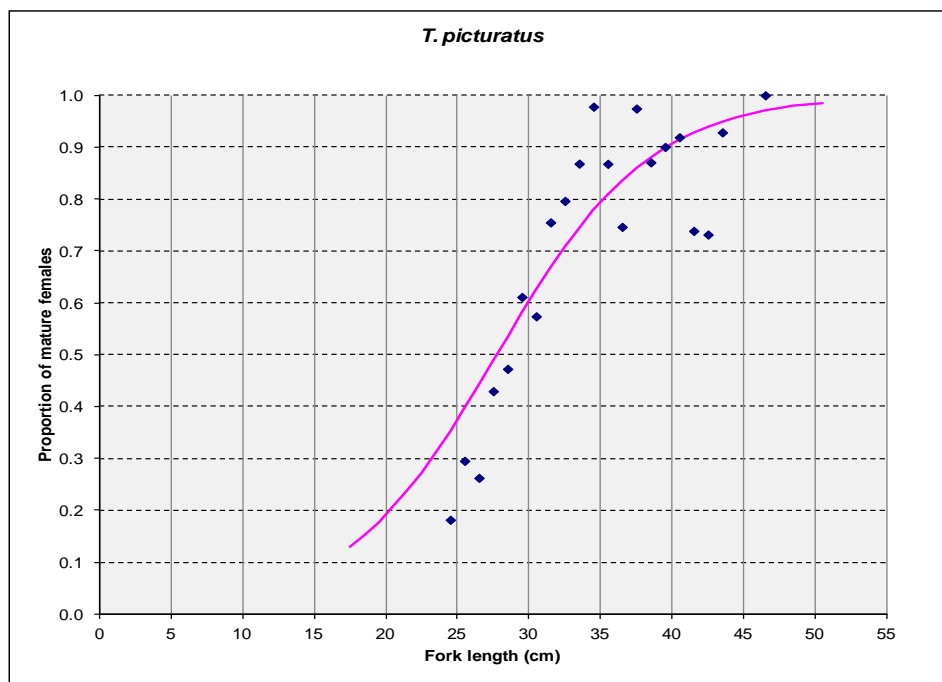


Figure 6. Size at sexual maturity (FL50) for the blue Jack mackerel from the Azores.

For the determination of age and growth, otoliths were collected from 405 specimens. The smallest estimated age was 0 and the highest 18+ (sexes pooled). Age groups 6, 7 and 8 were the dominant in the whole sample, accounting for approximately 31%. Plots of the fitted von Bertalanffy growth function are shown in Figure 7 and the estimated parameters are: $L_{\infty}=62.65$ cm; $k=0.08$ year⁻¹ and $t_0=-2.82$ year.

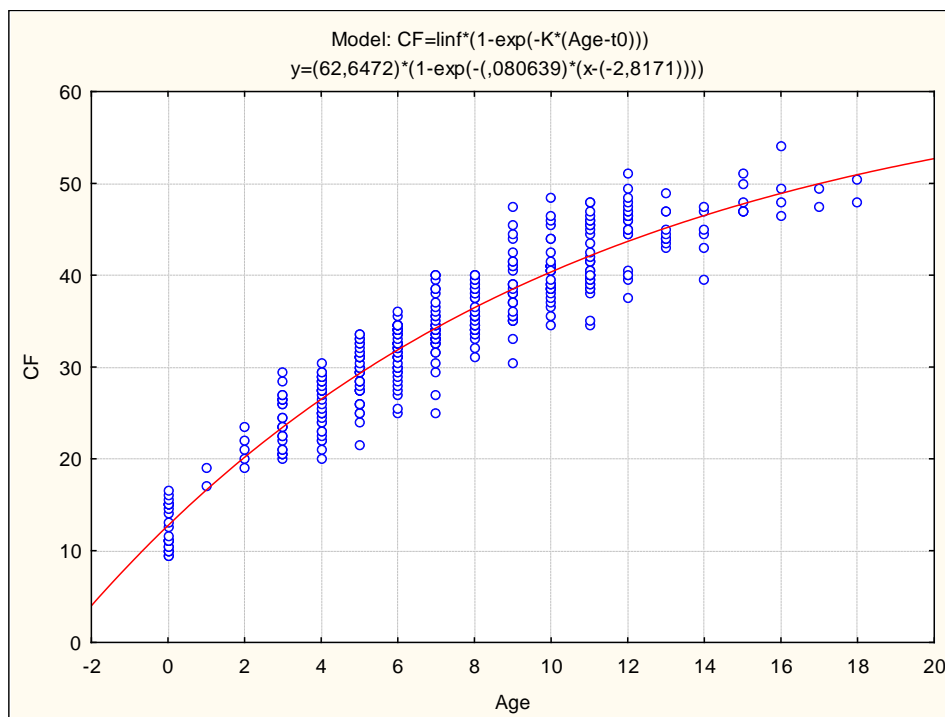


Figure 7. Von Bertalanffy growth curve for *T. picturatus* from the Azores.

B.3. Surveys

No survey information is available for this stock.

B.4. Commercial cpue

The catch and effort data collected includes fleet characteristics, total catch and landed, fishing effort, gears used and fishing grounds. These data were obtained through interviews of the fishermen at the landing sites, logbooks and by on-board observers. Two observer programmes are actually in course, one on the demersal logline fleet (not for 2013–2014), collecting detailed information on fishing operations, such as the total catch and size composition of the catches, including data on discards; and one other observer programme that collects information on board of the tuna vessels, including the catch of bait species, among which the blue Jack mackerel is the main target species.

Standardized cpue are available for three of the fisheries catching blue Jack mackerel, the small purse-seine fleet, the tuna baitboat catches of blue Jack mackerel to be used as live bait for tuna and the catches of the bottom longline fleet. The standardized cpue series were updated for the small purse-seine fleet and the baitboat catches of blue Jack mackerel, up to 2014. The cpue series for the longliners was not updated.

B.5. Other relevant data

C. Assessment: data and method

The assessment follows ICES approach to data-limited stocks.

The blue Jack mackerel (*Trachurus picturatus*) in Subdivision 10.a2 (Azores) is a data-limited stock category 3.

Trends on juvenile abundance are estimated upon tuna baitboat and purse-seine standardized cpues.

Trends on adult abundance are estimated upon longline vessels standardized cpues.

D. Short-term projection

E. Medium-term projections

F. Long-term projections

G. Biological reference points

H. Other issues

I. References

- Barreiros, J.P., Santos, R.S. and Borba, A.E. 2002. Food habits, schooling and predatory behaviour of the yellowmouth barracuda, *Shyraena viridensis* (Perciformes: Sphyraenidae) in the Azores. *Cybio* 26: 83–88.
- Guénette, S., and Morato, T. 2001 The Azores Archipelago, 1997. *Fish. Cent. Res. Rep.* 9.4: 241–270.
- Gomes, T., Sola, E., Grós, M., Menezes, G. and Pinho, M. 1998. Trophic relationship and feeding habits of demersal fishes from the Azores: importance to multispecies assessment. ICES CM 1998/O:7 Deep water fish and fisheries. 37pp.

- Menezes G.M., Sigler M.F., Silva H.M. and Pinho M.R. 2006. Structure and zonation of demersal fish assemblages off the Azores Archipelago (Mid-Atlantic). *Marine Ecology Progress Series* 324: 241–260.
- Paiva, V.H, Xavier, J., Geraldés, P., Ramirez, I., Garthe, S. and Ramos, J.A. 2010. Foraging ecology of Cory's shearwaters in different oceanic environments of the North Atlantic. *Marine Ecology Progress Series* 410: 257–268.
- Smith-Vaniz W.F. 1986. Carangidae. In: *Fishes of the North-Eastern Atlantic and Mediterranean*. Vol. II. Unesco, Paris. Eds. Whitehead, P.J.P., Bauchot, M.L., Hureau, J.C., Nielson, J. and Tortonese, E.R.
- Xavier, J., Magalhães, M.C., Mendonça, A.S., Antunes, M., Carvalho, N., Machete, M., Santos, R., Paiva, V. and Hamer, K.C. 2011. Changes in diet of Cory's Shearwaters *Calonectris diomedea* breeding in the Azores. *Marine Ornithology* 39: 129–134.