

AN UPDATE OF THE MOROCCAN COASTAL FLEET TARGETING BONITO (*SARDA SARDA*) SOUTH OF MOROCCAN ATLANTIC WATERS

Mohamed Bougharioun¹, Noureddine Abid², Sid Ahmed Baibbat³, Abdelillah Ikkiss⁴, Jilali Bensbai⁵

SUMMARY

*This document presents an update of the biological data and fisheries indicators for Atlantic bonito (*Sarda sarda*, Bloch 1793) targeted by the Moroccan coastal fleet south of the Moroccan Atlantic waters for the period 2010-2024. In total, 8736 trips were carried out by this fleet during 2024. The size for Atlantic bonito ranged between 30 and 83 cm SFL, with an average size of 51.4 cm observed in 2024. The mean size of fish and the CPUE showed an increasing trend from 2010 to 2024. The analysis emphasizes the need of ongoing monitoring to identify and investigate sudden changes and trends, helping to prevent overfishing.*

RÉSUMÉ

*Ce document présente une mise à jour des données biologiques et des indicateurs de pêche de la bonite à dos rayé (*Sarda sarda*, Bloch 1793) ciblée par la flottille côtière marocaine au Sud des eaux atlantiques marocaines pour la période 2010-2024. Au total, 8.736 sorties ont été effectuées par cette flottille en 2024. La taille de la bonite à dos rayé variait entre 30 et 83 cm SFL, avec une taille moyenne de 51,4 cm observée en 2024. La taille moyenne des poissons et la CPUE présentaient une tendance à la hausse entre 2010 et 2024. L'analyse souligne la nécessité d'une surveillance continue afin d'identifier et d'étudier les changements soudains et les tendances dans le but d'éviter la surpêche.*

RESUMEN

*Este documento presenta una actualización de los datos biológicos y los indicadores pesqueros del bonito del Atlántico (*Sarda sarda*, Bloch 1793) objeto de pesca por la flota costera marroquí al sur de las aguas atlánticas de Marruecos para el periodo 2010-2024. En total, esta flota realizó 8.736 mareas durante 2024. La talla del bonito del Atlántico osciló entre 30 y 83 cm SFL, con una talla media de 51,4 cm observada en 2024. La talla media de los peces y la CPUE mostraron una tendencia creciente de 2010 a 2024. El análisis subraya la necesidad de un seguimiento continuo para identificar e investigar los cambios repentinos y las tendencias, ayudando a prevenir la sobrepesca.*

KEYWORDS

*Atlantic bonito, *Sarda sarda*, CPUE, length distribution, mean size*

¹ National Institute for Fishery Research, Dakhla, Morocco, bougharioun@inrh.ma.

² National Institute for Fishery Research, Tanger, Morocco, abid@inrh.ma.

³ National Institute for Fishery Research, Laayoune, Morocco, baibbat@inrh.ma.

⁴ National Institute for Fishery Research, Dakhla, Morocco, ikkiss@inrh.ma.

⁵ National Institute for Fishery Research, Casablanca, Morocco, bensbai@inrh.ma.

1. Introduction

The Atlantic bonito is one of the most important species caught along the Moroccan Atlantic coasts. The most important fishing ground is located south of the Moroccan Atlantic coast (**Figure 1**). Following the construction of the new fishing port in Dakhla in 2002, an important coast fleet has been developed which targets mainly Atlantic bonito.

Atlantic bonito is the most targeted small tuna species by coastal vessels that employ various fishing gears, though handline is one of the main gears used to catch Atlantic bonito. Despite the availability of some data, catch statistics and biological knowledge on small tuna species remain fragmented and incomplete. This lack of comprehensive information has hindered ICCAT's ability to accurately assess the exploitation status of small tuna populations, including Atlantic bonito.

This paper provides an updated analysis of the size structure of Atlantic bonito catches, along with key indicators of this fishery, covering the period from 2010 to 2024. The study aims to enhance understanding of catch composition and fishing trends to support future management and conservation efforts.

2. Material and methods

2.1 Study area

The Dakhla handline fleet generally operating in the area between Cap Barbas (22°20N) and Cap Boujdor (26°13N) (**Figure 1**). This region is known for its high biological productivity, largely driven by the persistent coastal upwelling system along Morocco's southern Atlantic coast (Benazzouz *et al.*, 2015). The upwelling brings nutrient-rich waters to the surface, supporting an abundance of pelagic species and making this zone one of the most important fishing grounds.

2.2 Data collection and analysis

Size data for this species were obtained during the landing and at fish market from handline vessels. The measured size corresponds to the straight fork length (recorded to the nearest 1 cm), following standard fish length measurement protocols (ICCAT, 2021).

As the coastal vessels spend one day to reach the fishing grounds and another to return, the number of effective fishing days was calculated by subtracting two days from the total trip duration. A total of 8736 fishing trips were available for analysis.

Nominal CPUE per trip was calculated using the following formulas:

CPUE (kg/fishing day) = Catch in weight/number of fishing days.

Fishing effort = number of fishing days.

3. Results and discussions

From 2010 to 2024, fishing effort targeting Atlantic bonito (*Sarda sarda*) has shown distinct trends. Between 2010 and 2020, effort fluctuated considerably peaking around 2012, declining until 2015, and stabilizing thereafter. Since 2021, however, fishing effort has increased sharply, reaching a historic value of about 8 736 fishing days in 2024, which represent 98% increase compared to the average level of the time series (**Figure 2**).

An analysis of the annual Catch Per Unit Effort (CPUE) for Atlantic bonito reveals an overall increasing trend in catch rates, suggesting improved fishing performance over time. Between 2010 and 2016, the CPUE fluctuated between 500 and 900 kg per fishing day. From 2017 onwards, there was a sharp increase, peaking at nearly 1 900 kg per fishing day in 2023, followed by a slight decline of 9% in 2024. The highest CPUE values were observed in 2023 and 2024, reflecting particularly strong fishing years (**Figure 3**). While higher catch rate is economically beneficial for fishers, it is essential to monitor these trends to prevent overfishing.

The mean size of fish has remained relatively stable over the 11-year period, fluctuating between 49 cm and 54 cm. From 2014 to 2017, the mean size was steady around 51 cm. Between 2018 and 2021, the mean size gradually increased, peaking at 54 cm in 2021. In 2022, there was a noticeable drop, with the mean size falling back to about 50 cm. However, in 2023 and 2024, the mean size slightly improved, stabilizing at approximately 51 cm (**Figure 4**). This global trend points to a balanced fishery and a healthy population structure. However, continued monitoring is essential to detect and investigate sudden changes in the mean size, such as the decrease observed in 2022, which may indicate shifts in recruitment patterns or fishing practices that could impact the sustainability of the fishery.

The size range of Atlantic bonito harvested in the Dakhla area for the period 2010-2024 varied from 30 to 83 cm (SFL), with a multimodal size frequency distribution dominated by the adult fraction (**Figure 5**). The juvenile fraction (<41 cm) (Baibbat *et al.*, 2022) never exceeded 8% in 2016.

References

- Abid N., Benchoucha S., El Araaf S., El Fanichi C., Baibbat S., Idrissi M.H., Hamdi H., Oumarous M. 2015. Ressources et pêcheries de grands pélagiques à l'échéance 2014. In : *Institut National de Recherche halieutique (INRH)*, Rapport scientifique, pp. 84-139.
- Baibbat, Sidahmed & Izzabaha, Omar & Jilali, Bensbai & B., Benazzouz. 2022. Length based data-limited methods: Application on the Atlantic bonito, *Sarda sarda* (Bloch, 1793) in Morocco.
- ICCAT. 2021. Manual for Sampling Atlantic Tunas and Tuna-like Species. Annex 3 - Biological Sampling Protocols.
- Benazzouz, A., Demarcq, H. y González-Nuevo, G. 2015. Recent changes and trends of the upwelling intensity in the Canary Current Large Marine Ecosystem. In: *Oceanographic and biological features in the Canary Current Large Marine Ecosystem*. Valdés, L. and Déniz-González, I. (eds). IOC-UNESCO, Paris. IOC Technical Series, No. 115, pp. 321-330.

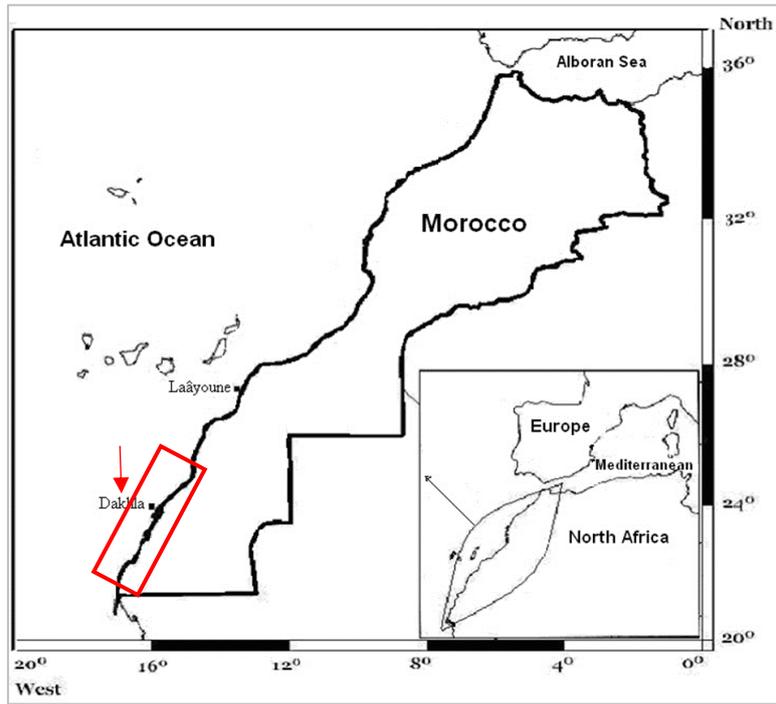


Figure 1. Fishing area of the handline fleet targeting Atlantic bonito south of Moroccan Atlantic waters.

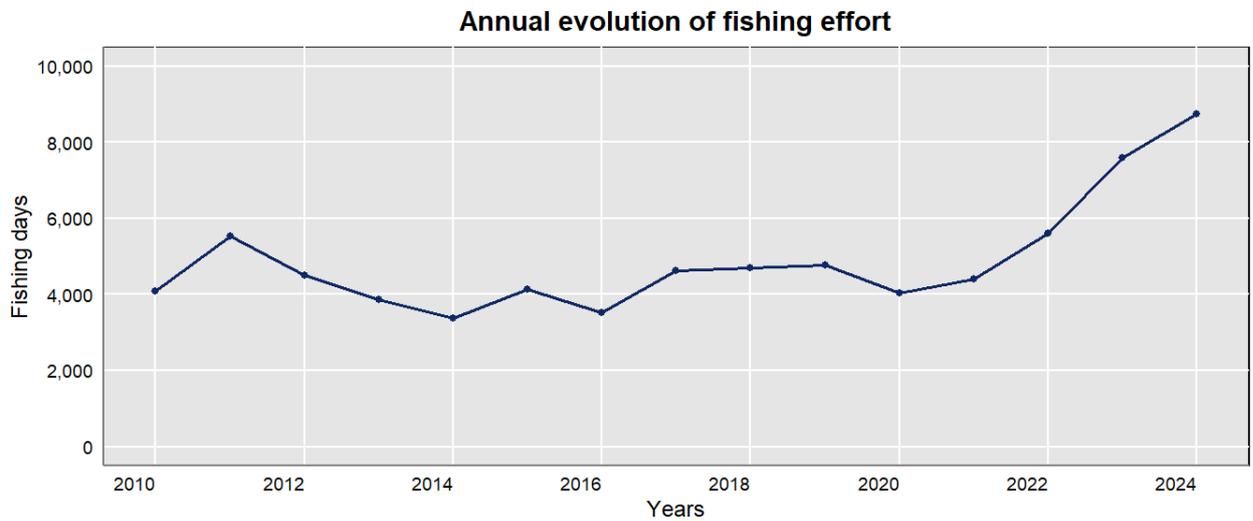


Figure 2. Annual evolution of fishing effort by coastal vessels fishing for Atlantic bonito between 2010 and 2024.

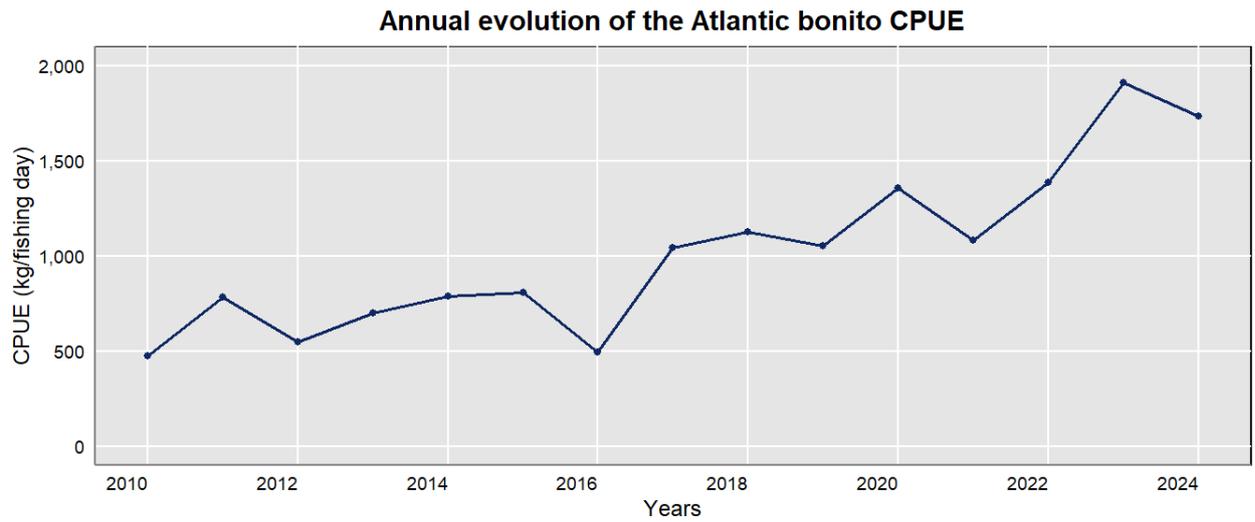


Figure 3. Evolution of the nominal CPUE of Atlantic bonito between 2010 and 2024.

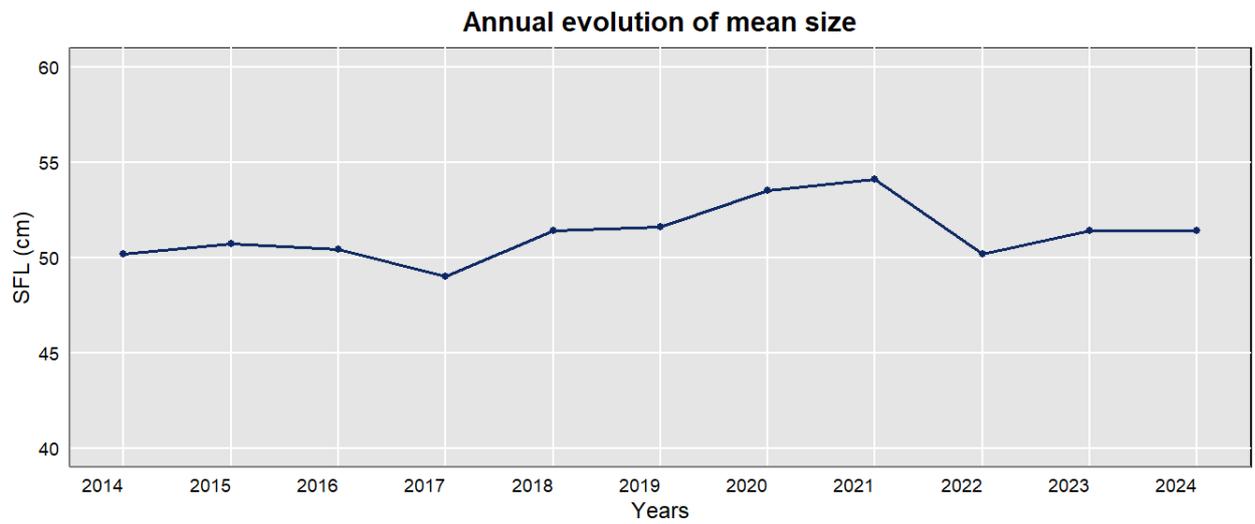


Figure 4. Evolution of the mean size of Atlantic bonito caught by the Moroccan handline vessels during the 2014-2024 period.

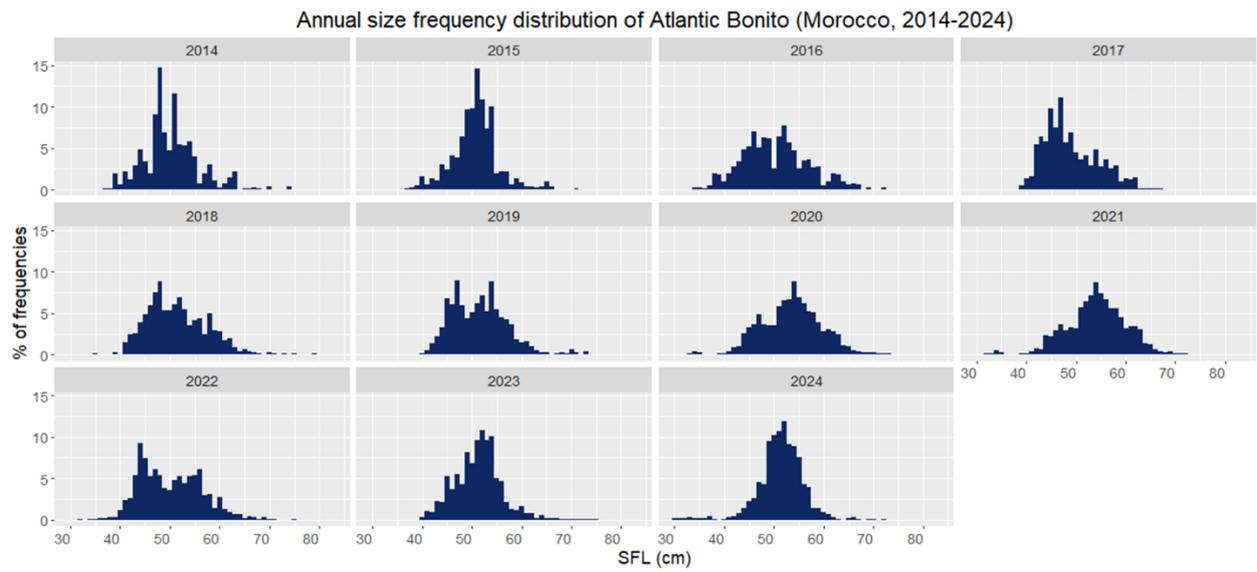


Figure 5. Yearly length distribution for Atlantic bonito for the 2014-2024 period.