

**THERE IS NO EVIDENCE FOR DIFFERENTIATING SAILFISH IN
THE ATLANTIC (*ISTIOPHORUS ALBICANS*) FROM SAILFISH IN
THE INDO-PACIFIC (*ISTIOPHORUS PLATYPTERUS*)**

Antonio Di Natale¹, Bruce B. Collette²

SUMMARY

The issue relating to the scientific name to be used for sailfish in the Atlantic Ocean has been under discussion for several years. There has been agreement to use Istiophorus albicans for the Atlantic population according to previous studies reporting some morphological differences from the Indo-Pacific Istiophorus platypterus. Recently, the discrepancies were reduced to variability, and genetic studies revealed that there are no significant differences between the two populations and therefore Istiophorus platypterus is the single world-wide species. This short paper summarises recent findings to help the decision of the ICCAT SCRS BIL SG and ICCAT SCRS on this issue.

RÉSUMÉ

La question du nom scientifique à utiliser pour le voilier de l'océan Atlantique fait l'objet de discussions depuis plusieurs années. Il a été convenu d'utiliser Istiophorus albicans, pour la population de l'Atlantique, sur la base d'études antérieures faisant état de certaines différences morphologiques avec l'Istiophorus platypterus de l'Indo-Pacifique. Récemment, les divergences ont été réduites à la variabilité et les études génétiques ont révélé qu'il n'y a pas de différences significatives entre les deux populations et qu'Istiophorus platypterus est donc l'unique espèce mondiale. Ce bref document résume les récentes découvertes, afin d'aider la décision du SG BIL du SCRS de l'ICCAT et du SCRS de l'ICCAT sur cette question.

RESUMEN

La cuestión relativa al nombre científico que debe utilizarse para el pez vela en el océano Atlántico ha sido objeto de debate durante varios años. Ha habido acuerdo en utilizar Istiophorus albicans para la población atlántica según estudios anteriores que informaban de algunas diferencias morfológicas con el Istiophorus platypterus del Indopacífico. Recientemente, las discrepancias se redujeron a la variabilidad, y los estudios genéticos revelaron que no hay diferencias significativas entre las dos poblaciones y, por lo tanto, Istiophorus platypterus es la única especie mundial. Este breve documento resume los hallazgos recientes para ayudar a la decisión del Grupo de especies de istiofótidus del SCRS de ICCAT y del SCRS de ICCAT sobre esta cuestión.

KEYWORDS

Sailfish; Istiophorus platypterus; Istiophorus albicans; systematics; taxonomy; genetics; official name; statistics; ICCAT

¹ Aquastudio Research Institute, Via Trapani 6, 98121 Messina, Italy. adinatale@acquariodigenova.it

² Chair, IUCN Tuna and Billfish Specialist Group and Research Associate, Division of Fishes, National Museum of Natural History, Smithsonian Institution, Washington, DC 20024, USA, COLLETTB@si.edu

1. Foreword

The most widely distributed species was considered to be the Indo-Pacific sailfish, *Istiophorus platypterus* (Shaw and Nodder, 1792), while another species was considered to inhabit the Atlantic Ocean, *Istiophorus albicans* (Latreille, 1804). The ICCAT Manual (Arocha and Ortiz, 2006) has been reporting the species as Sailfish, *Istiophorus albicans*, following Nakamura (1983, 1985, 1990) and FishBase³. But the FishBase maps are clearly contradictory, because they report *I. platypterus* distributed in all temperate, tropical and equatorial parts of the Ocean including the Atlantic, while *I. albicans* is reported as present only in the temperate, tropical and equatorial parts of the Atlantic, including the Mediterranean Sea. Froese and Pauli (2024) reported in the World Register of Marine Species (WORMS) *Istiophorus platypterus* as the species distributed in the Indo-Pacific and in the W. Atlantic, but they also reported *Istiophorus albicans* distributed in the W. Atlantic, in the Indian Ocean and in the E. Mediterranean. It is very clear that this situation needs a clarification.

In previous years and even recently, *I. platypterus* was often reported in the Atlantic, as the only sailfish species in the area (Maksimov, 1971; Voss, 1972; Jolley, 1977; Jolley and Irby, 1979; Arfelli and Amorim, 1981; Limouzy and Cayre, 1981; Prince *et al.*, 1986, 2010; Hazin *et al.*, 1994; Prager *et al.*, 1995; de Sylva and Breder, 1997; Lessa *et al.*, 2004; de Amorim *et al.*, 2009, 2011; Mourato *et al.*, 2009a, 2009b, 2014; Ortiz *et al.*, 2009; Pimenta *et al.*, 2009; Richardson *et al.*, 2009; Arizmendi-Rodríguez *et al.*, 2011; Wirtz *et al.*, 2014; Gardieff, 2024), clearly showing the need for the clarification of the proper name of the species.

In recent years, the IOTC and IATTC have been including *I. platypterus* in their statistics with the related FAO code SFA, while ICCAT includes *I. albicans* in its statistics with the related FAO code SAI.

This short paper summarises recent findings about the Sailfish that help clarify the systematics of the species and its taxonomic status.

2. Morphology

There has been continuous controversy over whether Atlantic and Indo-Pacific sailfishes are separate species or not. Nakamura (1983, 1985) separated Atlantic from Indo-Pacific populations of sailfish but there is no genetic evidence to support this. Sailfish were separated based on whether the pectoral and caudal fins are comparatively short, in Indo-Pacific *I. platypterus*, or slightly longer as in Atlantic *I. albicans* (immature specimens up to about 90 cm body length). However, Morrow and Harbo (1969) failed to find any differences in pectoral fin length between populations of sailfish, or in any other morphometric or meristic characters, and Nakamura (1983), considering that paper, wrote “Further study is needed before this issue is solved beyond doubt”. When two species were considered, the Indo-Pacific sailfish was reported to attain a greater size than Atlantic sailfish (Nakamura, 1985).

3. Genetics

Following the need for further studies proposed by Nakamura (1983), Graves and McDowell (1995), using restriction fragment length polymorphism (RFLP) analysis of mitochondrial DNA, found that the presence of identical haplotypes in samples from each of the three species-pairs of billfishes suggests that specific status may not be warranted for any of the Atlantic and Indo-Pacific populations (these three pairs are the Sailfish, Blue Marlin, and White-Striped marlins).

McDowell (2002) carried out a comprehensive study of *Istiophorus platypterus* and her results were included in a paper by Collette *et al.* (2006). This paper concludes: “There is no genetic evidence in the mtDNA control region to indicate that the Atlantic (*Istiophorus albicans*) and Indo-Pacific (*Istiophorus platypterus*) sailfishes are separate species (Collette *et al.* 2006). However, there are two distinct mtDNA clades, both evident in the Atlantic while only one is found in the Indo-Pacific (McDowell, 2002). There is also no difference in pectoral fin length or in any other morphometric or meristic characters between Atlantic and Indo-Pacific populations of sailfish (Morrow and Harbo 1969, McDowell 2002). There is no evidence that the Atlantic and the Indo-Pacific populations are separate species”.

A molecular study (Orrell *et al.*, 2006), in a comprehensive analysis of scombroid and xiphioid, again considered *Istiophorus platypterus* as the only species of this genus.

³ <https://www.fishbase.se/summary/Istiophorus-albicans.html> and <https://www.fishbase.se/summary/77>

A genetic work from an evolutionary perspective carried out by da Silva Ferrette *et al.* (2021) reported the following “The goal herein is to evaluate the phylogeography of sailfish *Istiophorus platypterus* between the Atlantic, Indian, and Pacific oceans. Our results evidenced a high genetic diversity and three distinct populations among the ocean basins with limited gene flow among them. In addition, the species is characterized by two deep evolutionary lineages that diverged during the Miocene/Pliocene transition, one of them is circumtropical while the other is restricted to the Atlantic Ocean. These lineages evolved along the successive glacial-interglacial cycles from the Pleistocene and remained isolated from each other in glacial refugium until deglaciation”. Even here, the authors considered just a single species with different populations.

A very recent study (da Silva Ferrette *et al.* 2023), carried out with advanced techniques, concluded again that there was one single species in the world Ocean, *Istiophorus platypterus* and they state: “...we presented a novel high-quality reference genome for the species and applied a seascape genomics approach to understand how marine environmental features may promote local adaptation and how it affects gene flow between populations. We delimit two populations between the Atlantic and Indo-Western Pacific oceans and detect outlier loci correlated with sea surface temperature, salinity, oxygen, and chlorophyll concentrations. However, the most significant explanatory factor that explains the differences between populations was isolation by distance. Despite recent population drops, the sailfish populations are not inbred”.

4. Conclusions

This short review of the most relevant information about the sailfish in the Atlantic confirms the IUCN recent assessment⁴ (Collette *et al.*, 2022) that there is just one species of sailfish in all temperate, tropical and equatorial parts of the Ocean, *Istiophorus platypterus* (Shaw and Nodder, 1792). The Global Biodiversity Information Facility⁵ also confirms this updated systematic position, considering *Istiophorus albicans* as synonym, after the extensive systematic revision made by Carneiro *et al.* 2014.

The morphological differences, based on few immature individuals of both species, are now considered within the variability of the species, while the genetic evidence is quite strong in defining one single species (*Istiophorus platypterus*) with different populations.

The incidental presence of the species in the Mediterranean Sea (Albania; Algeria; Croatia; Italy; Lebanon; Libya; Slovenia; Tunisia) is still considered as occasional and therefore it is there as vagrant. The rare catches should be considered as by-catch in the fisheries concerned.

Of course, being the Sailfish in the Atlantic a separate population from the Indo-Pacific one and taking into account the results of the genetic analyses from McDowell (2002), it makes sense for ICCAT to manage it under the current “two stocks” approach for management purposes.

Therefore, based on this evidence, we recommend that SCRS BIL SG:

- a) Request the SCRS to update the scientific name of the Sailfish to *Istiophorus platypterus* (Shaw and Nodder, 1792), FAO species code SFA.
- b) Request SCRS to fix the name issues in the ICCAT statistical tables, website and forms.
- c) Request the SCRS to revise the ICCAT manual accordingly.

⁴ The species was assessed by IUCN as “Vulnerable”

⁵ <https://www.gbif.org/species/5211984>

Bibliography

- Arfelli C.A., Amorim A.F. 1981. Estudo biológico-pesqueiro do agulhão-vela, *Istiophorus platypterus* (Shaw & Nodder, 1791), no sudeste e sul do Brasil (1971a 1980). Bull. Inst. Pesca 8: 9-22
- Arizmendi-Rodríguez D.I., Abitia-Cárdenas L.A., Galván-Magaña F., Trejo-Escamilla I. 2006. Food habits of Sailfish *Istiophorus platypterus* off Mazatlan, Mexico. Bulletin of Marine Science, 79 (3): 777-791
- Arocha F., Ortiz M. 2006. Chapter 2.1.8.1, Sailfish. ICCAT Manual, 2.1.8.1 SAI, Madrid: 143-156. https://www.iccat.int/Documents/SCRS/Manual/CH2/2_1_8_1_SAI_ENG.pdf
- Beardsley G.L., Merrett N.R., Richards W.J. 1975. Synopsis of the biology of the sailfish, *Istiophorus platypterus* (Shaw and Nodder, 1791). NOAA Tech. Rep. NMFS SSRF 675(3): 95-120
- Carneiro M., Martins R., Landi M., Costa F.O. 2014. Updated checklist of marine fishes (Chordata: Craniata) from Portugal and the proposed extension of the Portuguese continental shelf. Monography. European Journal of Taxonomy, 73: 1-73. <http://dx.doi.org/10.5852/ejt.2014.73>
- Collette B.B., McDowell J.R., Graves J.E. 2006. Phylogeny of recent billfishes (Xiphiidae). Bull. Mar. Sci., 79 (3):455-468. <https://openknowledge.fao.org/server/api/core/bitstreams/85d10b39-2391-4b74-8f28-a1c3567cdef6/content>
- Collette B.B., Di Natale A., Fox W., Graves J., Juan Jorda M., Pohlott B., Restrepo V., Schratwieser J. 2022. *Istiophorus platypterus*. The IUCN Red List of Threatened Species 2022: e.T170338A46649664. <https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T170338A46649664.en>
- da Silva Ferrette B.L., Mourato B., Hazin F. H. V., Arocha F., Williams S. M., Rodrigues Junior C. E., Porto-Foresti F., de Amorim A. F., Rotundo M. M., Coelho R., Hoolihan J. P., Sow F. N., Diaha N.'g C., Romanov E. V., Domingues R. R., Oliveira C., Foresti F., Mendonça, F. F. 2021. Global phylogeography of sailfish: deep evolutionary lineages with implications for fisheries management. Hydrobiologia 848:3883–3904. <https://doi.org/10.1007/s10750-021-04587-w>
- da Silva Ferrette B.L., Coimbra R. T. F., Winter S., De Jong M.J., Mackey Williams S., Coelho R., Rosa D., Rotundo M.M., Arocha F., Leite Mourato B., Fernandes Mendonça F., Janke A. 2023. Seascape Genomics and Phylogeography of the Sailfish (*Istiophorus platypterus*). Genome Biol. Evol., 15(4) <https://doi.org/10.1093/gbe/evad042>
- de Amorim A.F., Arfelli C.A., Pimenta E., Fina N.D., Silva N.P., Silva B.P., 2009. Sailfish sports fishing off Rio de Janeiro State, Brazil (2002-2008). Collect. Vol. Sci. Pap. ICCAT, 64(6): 1909-1914. https://www.iccat.int/Documents/CVSP/CV064_2009/n_6/CV0640601909.pdf
- de Amorin A.F., Pimenta E.G., de Amorin, M.C.C. 2011. Peixes-de-bico do Atlântico. Santos, Edição do Autor: 1-108
- de Sylva D.P., Breder P.R. 1997. Reproduction, gonad histology, and spawning cycles of North Atlantic billfishes (Istiophoridae). Bull. Mar. Sci., 60 (3): 668-697
- Gardieff, S. 2024. *Istiophorus platypterus*. Discover Fish, Florida Museum. <https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/istiophorus-platypterus/>
- Graves J.E., McDowell J.R. 1995. Inter-ocean genetic divergence of istiophorid billfishes. Marine Biology 122:193-203
- Froese R., Pauly D., (Eds). 2024. FishBase. *Istiophorus platypterus* (Shaw, 1792). Accessed through: World Register of Marine Species at: <https://www.marinespecies.org/aphia.php?p=taxdetails&id=158812>
- Hazin F.H., Lessa R., de Amorim A.F., Arfelli C.A., Antero da Silva J.N. 1994. Sailfish (*Istiophorus platypterus*) fisheries off Brazilian coast by national and leased longliners (1971-1991). Collect. Vol. Sci. Pap. ICCAT, 41: 199-207

- Jolley J.W. 1977. The biology and fishery of Atlantic sailfish *Istiophorus platypterus*, from south-east Florida. Florida Marine Research Publication 28: 1-31
- Jolley J.W., Irby E.W. 1979. Survival of tagged and released Atlantic sailfish (*Istiophorus platypterus*: Istiophoridae) determined with acoustical telemetry. Bull. Mar. Sci., 29: 155-169
- Junior T.V., Vooren C.M., Lessa R.P. 2004. Feeding habits of four species of Istiophoridae (Pisces:Perciformes) from northeastern Brazil. Environ. Biol. Fish., 70: 293-304
- Limouzy C., Cayre P. 1981. Pêche et aspects de la biologie du voilier de l'Atlantique (*Istiophorus platypterus*) sur les côtes Sénégalaises. Collect. Vol. Sci. Pap. ICCAT, 15: 361-371
- McDowell J.R. 2002. Genetic stock structure of the Sailfish, *Istiophorus platypterus*, based on nuclear and mitochondrial DNA. PhD dissertation, College of William & Mary, Virginia Institute of Marine Science, Williamsburg, VA (USA). Paper 1539616769. <https://dx.doi.org/doi:10.25773/v5-2wv9-6970>
- Maksimov V.P. 1971. The biology of the sailfish *Istiophorus platypterus* (Shaw & Nadder) in the Atlantic ocean. J. Ichthyol. 6: 850-855
- Morrow J.E., Harbo S.J. 1969. A revision of the sailfish genus *Istiophorus*. Copeia 1969 (1): 34-44
- Mourato B.L., Pinheiro P., Hazin F.H.V., Basante V., de Amorim A.F., Pimenta E., Guimarães C. 2009. Preliminary analysis of gonad development, spawning period, sex ratio and length at first sexual maturity of sailfish, *Istiophorus platypterus*, in the Brazilian coast. Collect. Vol. Sci. Pap. ICCAT, 64 (6): 1927-1940. https://www.iccat.int/Documents/CVSP/CV064_2009/n_6/CV0640601927.pdf
- Mourato B.L., Carvalho F., Musyl M., Amorim A., Pacheco J.D., Hazin H., Hazin, F. 2014. Short-term movements and habitat preferences of Sailfish, *Istiophorus platypterus* (Istiophoridae), along the southeast coast of Brazil. Neotropical Ichthyology, 12 (4): 861-870
- Nakamura I. 1983. Systematics of the billfishes (Xiphiidae and Istiophoridae). Seto Marine Biological Laboratory 28: 255–396. <https://core.ac.uk/reader/39302000>
- Nakamura I. 1985. FAO species catalogue. Vol. 5. Billfishes of the world. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date. FAO, Rome, FAO Fish. Synop., 125(5): 1-65
- Nakamura, I. 1990. Istiophoridae. In J. C. Quéro, J. C. Hureau, C. Karrer, A. Post, and L. Saldanha (eds.) Checklist of the fishes of the eastern tropical Atlantic (CLOFETA). JNICT, Lisbon; SEI, Paris; and UNESCO, Paris. Vol. 2: 999-1007
- Orrell T., Collette B.B., Johnson G. 2006. Molecular data support separate scombroid and xiphioid clades. Bulletin of Marine Science, 79 (3): 505-519
- Ortiz M., Diaz G.A., Hoolihan J.P. 2009. Updated sailfish (*Istiophorus platypterus*) catch rates from the U.S. pelagic longline fishery in the northwest Atlantic and Gulf of Mexico, 1986-2007. Collect. Vol. Sci. Pap. ICCAT, 64 (6): 1858-1870. https://www.iccat.int/Documents/CVSP/CV064_2009/n_6/CV0640601858.pdf
- Pimenta E.G., Rezende M.F., de Amorim, A.F. 2009. Stomachal content of sailfish, *Istiophorus platypterus*, caught off northern Rio de Janeiro State, Brazil. Collect. Vol. Sci. Pap. ICCAT, 64 (6): 1903-1908. https://www.iccat.int/Documents/CVSP/CV064_2009/n_6/CV0640601903.pdf
- Prager M.H., Lee D.W., Prince E.D. 1995. Empirical length and weight conversion equations for blue marlin, white marlin, and sailfish from the North Atlantic. Bull. Mar. Sci., 56: 201-210
- Prince E.D., Lee D.W., Wilson C.A., Dean J.M. 1986. Longevity and age validation of a tag-recaptured Atlantic sailfish *Istiophorus platypterus*, using dorsal spines and otoliths. Fish. Bull., 84 (3): 493-502

- Prince E.D., Luo J., Goodyear C.P., Hoolihan J.P., Snodgrass D., Orbeson E.S., Serafy J.E., Ortiz M., Schirripa M. 2010. Ocean scale hypoxia-based habitat compression of Atlantic istiophorid billfishes. *Fish. Oceanogr.* 19: 448-462
- Richardson D.E., Llopiz J.K., Leaman K.D., Vertes P.S., Muller-Karger F.E., Cowen R.K. 2009. Sailfish (*Istiophorus platypterus*) spawning and larval environment in a Florida Current frontal eddy, *Progress in Oceanography*, ISSN 0079-6611, 82 (4): 252-264. <https://doi.org/10.1016/j.pocean.2009.07.003>
- Shaw G., Nodder F. P. 1789-1813. *The Naturalist's Miscellany, or coloured figures of natural objects; drawn and described from nature. London.* 23 vols. unnumbered pages, Pl. 88 (1792)
- Voss G.L. 1972. A survey of the biology of the sailfish, *Istiophorus platypterus*, from the western Atlantic. *Proc. 15th Annual Intl. Game Fish Research Conf.*: 1-13
- Wirtz P., Bingeman J., Bingeman J., Fricke R., Hook T.J., Young J. 2014. The fishes of Ascension Island, central Atlantic Ocean—new records and an annotated checklist. *Journal of the Marine Biological Association of the United Kingdom*: 1-16. <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/fishes-of-ascension-island-central-atlantic-ocean-new-records-and-an-annotated-checklist/0740D2D46CACA3E0E37A8EDDEE465E50>