BONY FISH OF ALGERIAN MARINE FAUNA: A HISTORICAL REVIEW WITH AN UPDATED CHECKLIST AND NEW RECORDS

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Abstract. This study offers a comprehensive historical overview of bony fish along the Algerian coastline, combining previous research with original observations spanning from 1850 to 2025. We analyzed multiple occurrence databases and integrated Local Ecological Knowledge (LEK) collected through interviews with 88 fishermen and maritime workers. Species identification relied on morphological and meristic characteristics, supported by FAO identification guides for Mediterranean and Atlantic marine species, FishBase, relevant scientific literature. A total of 411 species were recorded, encompassing 126 families, 46 orders, and 258 genera, including six species newly documented in the region. Most important families are Sparidae, Gobiidae, Gobiidae, Labridae, Blenniidae, Myctophidae, Carangidae, Scombridae and Syngnathidae Based on their biogeographical origins, the dataset comprises 359 native species (87%), 33 introduced species (9%), and 19 Mediterranean endemics (4%). The Algerian bony fish fauna represents 58.7% of that of the Mediterranean Sea. The rate of exotic species (9%) is lower than that for the Mediterranean Sea (15%). This inventory establishes a critical baseline for studying species range expansions, the spread of non-native species, and conservation initiatives in the Mediterranean, contributing significantly to a comprehensive ichthyological database of bony fishes inhabiting Algerian waters.
Keywords: *biodiversity monitoring, citizen science, non-native species, Algerian fisheries, inventory, Alboran Sea, Western Mediterranean*

Introduction

The Mediterranean region is a vital center for aquatic biodiversity, home to a significant number of endangered, threatened, or vulnerable species. This is particularly evident in areas such as the western Mediterranean shelves, the Strait of Gibraltar, the Alboran Sea, the coasts of northwest Africa, and the Adriatic, and Aegean Seas (Coll et al., 2010). Around 20% of fish species reported in the region are non-native, and this percentage is rising rapidly due to the ongoing introduction of new species. This trend has been widely documented by researchers such as Zenetos et al. (2010, 2017, 2022), Kovačić et al. (2021), and Png-Gonzalez et al. (2023), all of whom have highlighted the increasing prevalence of non-native species in

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Mediterranean ecosystems due to several factors: the opening of the Suez Canal in 1869, which is responsible for more than half of the Mediterranean's exotic species, including most non-native fish. The Strait of Gibraltar, international shipping, mariculture, aquaristics and climate change are other contributing factors (Rodrigo-Gámiz et al., 2014; Azzurro et al., 2019; Zenetos and Galanidi, 2020; García-Monteiro et al., 2022; Garrabou et al., 2022). FishBase records 454 marine species for Algeria, which includes 74 species of chondrichthyans and 380 species of bony fishes. Additionally, 782 marine species are listed for the Mediterranean, 47 of which are endemic, while 136 are introduced. Some of these Introduced species have established stable populations and are becoming more abundant, although the study of these species remains underexplored, largely due to a lack of taxonomists, despite Algeria's biodiversity. Significant contributions in this field include studies by Djabali et al. (1993), Chalabi (1999), Derbal and Kara (2001), Hemida et al. (2003, 2004, 2009), Kara and Oudjane (2009), Refes et al. (2010), Kara et al. (2012), Refes and Semahi (2014), Grimes et al. (2010, 2016, 2018), Kara and Bourehail (2020), Bensahla-Talet (2020) Hussein et al. (2020), Kacimi et al. (2021) and Boubekri et al. (2022). This study aims to compile an updated inventory of bony fishes along the Algerian Alboran coast, incorporating a historical checklist, a biodiversity survey, a biogeographic analysis, and a comprehensive synthesis. The objective is to enhance our understanding of the occurrence and distribution of newly observed or rarely encountered non-native marine species between 1850 and 2025.

Material and methods

Study area

General characteristics of the Algerian Alboran coast

The Alboran Sea, located in the westernmost region of the Algerian-Provençal basin, stretches from Cape Gata in Spain to Cape Figalo in Ain Temouchent, Algeria (*Fig. 1*). It extends between the Iberian Peninsula to the north and the Maghreb to the south, with the Strait of Gibraltar forming its western boundary (*Fig. 1*). The sea is named after the islet of Alboran, positioned between Almería and Melilla (Bencker, 1953; Sánchez-Garrido and Nadal, 2022). This study focuses primarily on the Algerian sector of the Alboran Sea, which is heavily influenced by Atlantic currents (Millot, 1999). The region covers several coastal areas: the Oran coastline, which spans 124 km and features two main ports, a fishing shelter, and 18 beaches; the Ain Temouchent coastline, stretching 80 km, includes a 5000 m² fishing zone, two fishing ports, a newly built fishing shelter, and seven beaches; and the Tlemcen coastline, which extends 74 km and contains a mixed-use port at Ghazaouet, a port under construction at Sidna-Youchaa, a fishing shelter at Honaine, and a marina at Marsat Ben Mhidi (*Fig. 1*). The coordinates of all sampling sites are provided in *Table 1.*

Data collection

The data and samples were collected as part of the first author's PhD thesis project, conducted between December 2018 and July 2024. Surveys carried out at the fisheries resources department (DPRH, Algiers) provided an updated inventory of fish products sold at fisheries in three wilayas: Tlemcen, Ain Temouchent, and Oran. *Table 1* presents the geographical coordinates of the sampling sites along the Algerian Alboran coast.

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For the inclusion of newly recorded species, including those identified through local ecological knowledge or photographic evidence, we integrated survey data with information from FishBase, relevant scientific literature, and the fish inventory conducted in eastern Algeria by Refes et al. (2010). We also referred to Eschmeyer's phylogenetic classification as presented in the *Catalog of Fishes* (https://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp), consulted recent Mediterranean checklists and taxonomic references (e.g., Kovačić et al., 2021).

Table 1. *Geographic coordinates of sampling sites along the Algerian Alboran coast*

Site	N	Sampling method	Locality	Latitude	Longitude
Tlemcen	1	Fishing shelter	Marsat ben M'hidi	35.085251	-2.198152
	2	Fisherman Obs	Bider	35.074098	-2.084463
	3	Fisherman Obs	B'Hira	35.069725	-1.943542
	4	Fishery	Ghazaouet Port	35.10204	-1.86109
	5	Fishing shelter	Sidna youchaa	35.12283	-1.77004
	6	Fishing shelter	Honaine	35.180796	-1.660191
Ain Temouchent	7	Fisherman Obs	Rachgoune	35.302021	-1.471151
	8	Diver Obs	Rachgoun Island	35.324859	-1.475258
	9	Fishery	Béni-Saf Port	35.304471	-1.389712
	10	Fisherman Obs	Hilal	35.364273	-1.275918
	11	Fisherman Obs	Terga	35.440998	-1.236607
	12	Fisherman Obs	Sassel	35.491497	-1.219799
	13	Diver Obs	Sbiaate island	35.553324	-1.198937
	14	Fishery	Bouzedjar Port	35.574068	-1.166699
	15	Fisherman Obs	Bouzedjar	35.584018	-1.149391
Oran	16	Fisherman Obs	Madagh1	35.638937	-1.061609
	17	Fisherman Obs	Cap blanc	35.683187	-0.989069
	18	Diver Obs	Pilicy	35.695191	-0.982086
	19	Diver Obs	Habibas Island	35.724007	-1.130445
	20	Fisherman Obs	Les andalouses	35.706287	-0.893412
	21	Diver Obs	Paloma Island	35.772868	-0.901738
	22	Fisherman Obs	Bousfer	35.768679	-0.796352
	23	Fisherman Obs	Corales	35.759494	-0.825251
	24	Diver Obs	La madrague	35.766611	-0.820208
	25	Obs Fisherman	Saint Rock	35.737022	-0.732289
	26	Fishery	Oran Port	35.709693	-0.655873
	27	Fishing shelter	Kristel	35.822299	-0.489917
	28	Fisherman Obs	Sidi Moussa	35.823578	-0.488104
	29	Diver Obs	Cap aiguille	35.874713	-0.488769
	30	Fisherman Obs	Cap carbon	35.896179	-0.337863
	31	Fisherman Obs	Saint michel	35.862549	-0.296142
	32	Fishery	Arzew Port	35.846244	-0.304307

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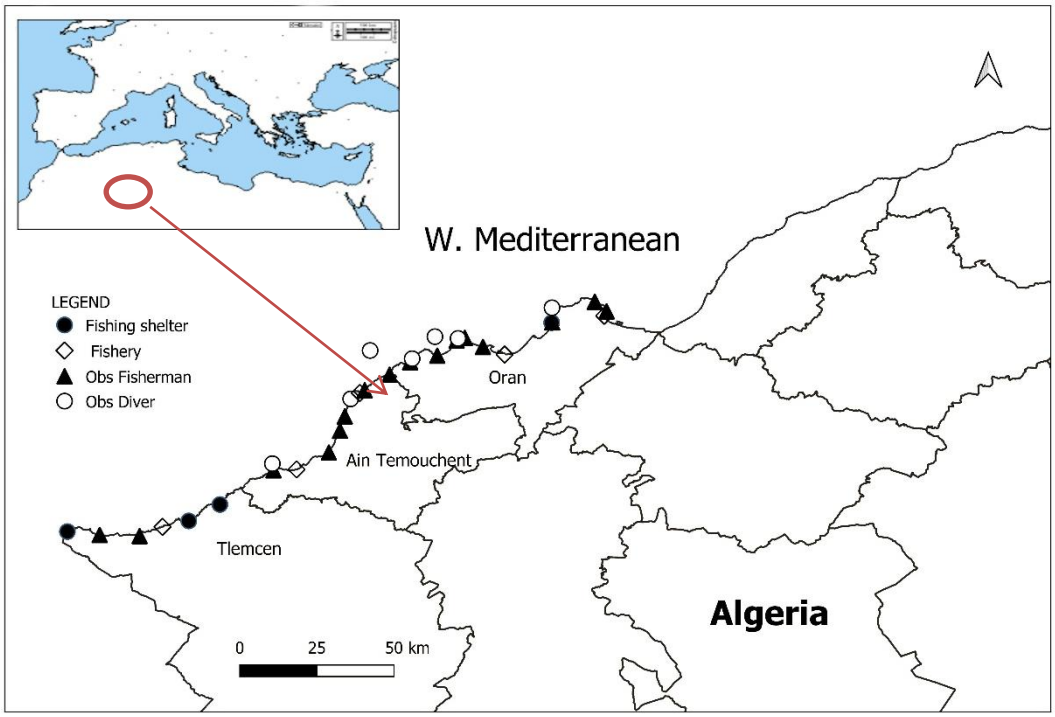

Figure 1. *Map showing the sampling sites along the Algerian Alboran coast*

Furthermore, we examined several occurrence databases, including museum collection atlases and iNaturalist (2025), and verified the taxonomic status of species in collaboration with the editorial board of the World Register of Marine Species (WoRMS) (Bernot et al., 2024). Preserved specimens of fishes collected in Algerian waters were inventoried from the Global Biodiversity Information Facility (GBIF) and on-line catalogues of main natural history museums (MNHN-Paris, NHM-London, USNM-Washington, AMNH-New York, UFM-Gainesville).

To prevent inaccuracies in the reporting of "first records" (Bello et al., 2012), which could compromise biogeographic consistency and fail to acknowledge the contributions of researchers compiling faunal inventories, we followed the methodological guidelines proposed by Bello et al. (2014). This comprehensive approach allowed us to compile an updated and validated list of bony fish species recorded in Algerian waters since 1850 (*Table 2*).

To enrich our study, we incorporated local ecological knowledge (LEK), formerly known as traditional ecological knowledge (TEK). LEK encompasses knowledge and practices passed down through generations within local communities, reflecting cultural memory and sensitivity to environmental change (Azzurro et al., 2019; Gann et al., 2019).

For the local inventory, we conducted 58 monthly surveys at fish landing sites and local markets. Data collection was carried out in collaboration with local fishers, a widely recognized approach in fisheries science that complements traditional scientific surveys (Johannes et al., 2000). Although there was no universal method to verify the validity of every record, in the vast majority of cases, we found no reason to doubt the accuracy or reliability of the data. Despite some limitations, such as the absence of standardized capture techniques and the subjective nature of observations, this approach remains a valuable source of information on regional biodiversity.

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A total of 88 fishermen and maritime workers from the three regions participated in the study LEK, grouped into three categories. Deckhands working on port fishing vessels were classified into two types: those operating trawlers and those on sardine boats. Crews of small boats were also divided into two groups: those using gillnets and trammel nets to target small to medium-sized demersal fish, and those employing lines, hooks, or spearguns to catch larger species. Furthermore, the acquisition of three levels of scuba diving certification, including advanced training in deep diving, enabled us to observe and identify non-commercial marine species directly in their natural habitats.

Interviews were conducted using photographs of bony fish species, allowing participants to assess their perceived abundance. These data confirmed species presence and abundance, classified into four categories following Azzurro et al. (2011): 0 = absent or not recorded, 1 = single record (caught once), 2 = Rare (caught once a year), 3 = common (trade species), the results are given in *Table 2*.

Species identification was based on morphological and meristic characteristics, using UNESCO and FAO guides and catalogues (Collette and Nauen, 1983; Whitehead et al. 1984-1986; Fisher et al., 1987; Cohen et al., 1990; Heenstra and Randal, 1993; Bariche, 2012; Carpenter and De Angelis, 2016). Records of non-native species were updated using the ORMEF (Occurrence Records of Mediterranean Exotic Fishes) georeferenced database and the CIESM Atlas (https://www.ciesm.org/atlas/appendix1.html) to monitor invasive and exotic species in the Mediterranean. Species verification was further cross-referenced with the Global Invasive Species Database (GISD).

The recorded species were categorized as native, introduced, or endemic (*Table 2*; *Fig. 2*). The group of introduced species includes those that have expanded their geographic range, exotic species, and Lessepsian migrants. In the Mediterranean, these species significantly influence ecological dynamics. Invasive taxa such as the lionfish and rabbitfish (*Siganus* spp.), introduced through the Suez Canal via Lessepsian migration, compete with native fauna, degrade habitats, and disrupt local food webs.

In Algeria, several endangered Mediterranean fish species are protected by law under national regulations published between 1976 and 2004. These legal frameworks impose fishing restrictions, regulate trade and designate marine protected areas. Swordfish (*Xiphias gladius*) is a key example, benefiting from specific conservation measures and a fishing ban from 1 January to 31 March each year due to its ecological importance and declining populations.

This study presents a phylogenetically structured inventory of bony fishes along the Algerian coast. *Table 2* includes annotations and references corresponding to the first recorded occurrences of these species in Algerian waters.

Results and discussion

Data on bony fish observed along the Algerian coast indicate a marked shift in ichthyological diversity over time, reflecting both temporal and spatial dynamics. This comprehensive analysis not only highlights the main trends that have shaped the taxonomic composition of fish communities, but also uncovers regional variations in species distribution patterns and abundance. By integrating historical records with recent observations, the study reveals that certain species, once widespread and well, documented, have either declined significantly or disappeared from some coastal areas, while others, newly recorded or previously rare, have increased in frequency.

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These shifts point to complex ecological processes, influenced by a combination of climatic fluctuations, changes in sea temperature and salinity, habitat degradation, overfishing, and the introduction of non-native species, whether intentional or accidental. A detailed biogeographic assessment shows that these transformations are not uniform across the Algerian coast, but vary between the western, central, and eastern sectors, suggesting that local environmental pressures and human activities play a decisive role in shaping community structures.

In addition, taxonomic patterns indicate a growing presence of thermophilic and opportunistic species, often associated with subtropical or invasive faunal assemblages, further supporting the hypothesis of ongoing ecological shifts. This evolving ichthyofaunal profile is documented in an updated checklist of bony fish species from Algerian waters (*Table 2*), which serves as a baseline for future monitoring and conservation efforts.

Table 2. *List of marine bony fishes in Algerian waters*

	Guichenot 1850	Bourjot 1870	Dieuzeide 1954-63	Refes et al. 2010	Fishbase 2025	Present study	LEK	Musuem specimens	iNaturalist 2025	Status IUCN	Comments
Holostei											
Acipenseriformes											
Acipenseridae											
Acipenser sturio (Linnaeus, 1758)			X		X					CR	
Teleostei											
Notacanthiformes											
Halosauridae											
Halosaurus ovenii Johnson, 1864			X		X					LC	IS
Notacanthidae											
Notacanthus bonaparte Risso, 1840			X		X			X		NE	
Elopiformes											
Elopidae											
Elops lacerta Valenciennes, 1847	X									LC	
Anguilliformes											
Muraenidae											
Gymnothorax unicolor (Delaroche, 1809)	X	X	X	X	X	X	X	X		LC	RS
Muraena helena Linnaeus, 1758	X	X	X	X	X	X	X	X	X	LC	TS
Ophichthidae											
Apterichtus anguiformis (Peters, 1877)					X					LC	Bauchot, 1986
Apterichtus caecus (Linnaeus, 1758)					X					LC	Bauchot, 1987
Dalophis imberbis (Delaroche, 1809)					X	X	X			LC	
Echelus myrus (Linnaeus, 1758)			X	X	X	X	X	X	X	LC	

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Ophichthus rufus (Rafinesque, 1810)				X	X	X	X			LC	ES
Ophisurus serpens (Linnaeus, 1758)	X	X	X	X	X		X	X	X	LC	
Pisodonophis semicinctus (Richardson, 1848)			X		X					LC	IS
Nettastomatidae											
Facciolella oxyrhynchus (Bellotti, 1883)				X	X					NE	Derbal and Kara, 2001
Nettastoma melanura (Rafinesque, 1810)			X	X	X					LC	
Congridae											
Ariosoma balearicum (Delaroche, 1809)	X	X	X		X	X	X	X	X	LC	
Conger conger (Linné, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Gnathophis mystax (Delaroche, 1809)			X	X	X	X	X	X		LC	
Nemichthyidae											
Nemichthys scolopaceus (Richardson, 1848)					X					LC	Nielsen, 1984
Anguillidae											
Anguilla anguilla (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	CR	RS
Clupeiformes											
Clupeidae											
Sprattus sprattus (Linnaeus, 1758)					X					LC	Whitehead, 1985
Dorosomatidae											
Sardinella aurita (Valenciennes,1847)		X	X	X	X	X	X	X	X	LC	TS
Sardinella maderensis (Lowe, 1838)			X	X	X	X	X	X		VU	Kassar, 2019
Alosidae											
Alosa pseudoharengus (Wilson, 1811)		X								LC	NW Atlantic, 2 specimens (Algiers)
*Alosa algeriensis (*Regan, 1916)					X	X	X	X	X	EN	Baikeche et al., 2021
Alosa alosa (Linnaeus, 1758)	X		X		X	X	X	X		LC	RS
Alosa fallax (Lacepède,1803)		X	X	X	X	X	X	X	X	LC	
Sardina pilchardus (Walbaum,1792)	X	X	X	X	X	X	X	X	X	LC	TS
Engraulidae											
Engraulis encrasicolus (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Dussumieriidae											
Etrumeus golanii DiBattista, Randall & Bowen, 2012										DD	IS/Kassar and Hemida, 2017
Alepocephaliformes											
Alepocephalidae											
Alepocephalus rostratus (Risso, 1820)				X	X					LC	

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Argentiniformes											
Argentinidae											
Argentina sphyraena (Linnaeus, 1758)			X	X	X					NE	
Glossanodon leioglossus (Valenciennes, 1848)	X	X		X	X			X		LC	
Microstomatidae											
Microstoma microstoma (Risso, 1810)					X					LC	Cohen, 1984
Nansenia oblita (Facciolà, 1887)				X	X					NE	Cohen, 1984
Salmoniformes											
Salmonidae											
Salmo macrostigma (Duméril, 1858)					X					DD	Delling and Doadrio, 2005
Stomiiformes											
Gonostomatidae											
Cyclothone braueri (Jespersen & Tåning, 1926)			X		X			X		LC	
Cyclothone microdon (Günther, 1878)			X		X					LC	
Cyclothone pygmaea Jespersen & Tåning, 1926			X		X			X		LC	ES
Gonostoma denudatum Rafinesque, 1810					X					LC	Badcock, 1984
Sternoptychidae											
Argyropelecus hemigymnus (Cocco, 1829)				X	X					LC	Badcock, 1984
Maurolicus muelleri (Gmelin, 1789)	X			X	X					LC	Arambough, 1927
Phosichthyidae											
Ichthyococcus ovatus (Cocco, 1838)			X		X					LC	
Vinciguerria attenuata (Cocco, 1838)					X			X		LC	Badcock, 1984
Vinciguerria poweriae (Cocco, 1838)			X		X					LC	
Stomiidae											
Bathophilus nigerrimus (Giglioli, 1882)					X					LC	
Chauliodus sloani (Bloch & Schneider, 1801)			X	X	X			X	X	LC	
Stomias boa (Risso, 1810)	X		X	X	X		X	X		LC	
Aulopiformes											
Aulopodidae											
Aulopus filamentosus (Bloch, 1792)	X		X	X	X	X	X	X	X	LC	RS
Synodontidae											
Synodus saurus (Linnaeus,1758)		X	X	X	X	X	X	X	X	LC	

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Chlorophthalmidae											
Chlorophthalmus agassizi (Bonaparte, 1840)			X	X	X			X		LC	
Ipnopidae											
Bathypterois dubius (Vaillant, 1888)					X					LC	Gibbs, 1984
Bathypterois grallator (Goode & Bean, 1886)					X					LC	Sulak, 1984
Paralepididae											
Arctozenus risso (Bonaparte, 1840)				X	X			X		LC	Post, 1984
Paralepis coregonoides (Risso, 1820)	X			X	X			X		LC	Bauchot, 1987
Evermannellidae											
Evermannella balbo (Risso, 1820)					X			X		LC	Johnson, 1984
Lestidiidae											
Lestidiops pseudosphyraenoides (Ege, 1918)					X					NE	Post, 1984
Lestidiops sphyrenoides (Risso, 1820)					X			X		LC	Post, 1984
Myctophiformes											
Myctophidae											
Benthosema glaciale (Reinhardt, 1837)			X	X	X			X		LC	
Ceratoscopelus maderensis (Lowe, 1839)				X	X			X		LC	Etsouri et al., 2023
Diaphus holti (Tåning, 1918)			X		X			X		LC	
Diaphus metopoclampus (Cocco, 1829)				X	X					LC	Hulley, 1984
Diaphus rafinesquii (Cocco, 1838)			X		X			X		LC	
Diogenichthys atlanticus (Tåning, 1928)					X					LC	
Electrona risso (Cocco, 1829)			X	X	X			X		LC	
Hygophum benoiti (Cocco, 1838)			X		X			X		LC	
Hygophum hygomii (Lütken, 1892)					X					LC	Hulley, 1984
Lampanyctus crocodilus (Risso, 1810)				X	X			X		LC	Hulley, 1984
Lampanyctus pusillus (Johnson, 1890)					X			X		LC	Hulley, 1984
Lobianchia dofleini (Zugmayer, 1911)					X			X		LC	Hulley, 1984
Lobianchia gemellarii (Cocco, 1838)			X		X					LC	
Myctophum punctatum (Rafinesque, 1810)			X	X	X			X		LC	
Notoscopelus bolini (Nafpaktitis, 1975)					X			X		LC	Bauchot, 1987
Notoscopelus elongatus (Costa, 1844)				X	X			X		LC	Endemic species

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Symbolophorus veranyi (Moreau, 1888)				X	X					LC	Hulley, 1984
Lampriformes											
Lampridae											
Lampris guttatus (Brünnich, 1788)					X		X			LC	Palmer, 1986
Lophotidae											
Lophotus lacepede (Giorna, 1809)					X		X		X	LC	Bauchot, 1987
Trachipteridae											
Trachipterus trachypterus (Gmelin, 1789)		X			X					LC	Bauchot, 1987
Zu cristatus (Bonelli, 1819)		X			X				X	LC	Palmer, 1986
Regalecidae											
Regalecus glesne (Ascanius, 1772)		X	X		X			X		LC	
Zeiformes											
Zeidae											
Zeus faber (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	DD	TS
Gadiformes											
Phycidae											
Phycis blennoides (Brünnich, 1768)	X	X	X	X	X	X	X		X	LC	TS
Phycis phycis (Brünnich, 1768)	X		X	X	X	X	X	X	X	LC	TS
Gaidropsaridae											
Gaidropsarus biscayensis (Collett, 1890)					X					NE	
Gaidropsarus granti (Regan, 1903)						**NR**				DD	IS
Gaidropsarus mediterraneus (Linnaeus, 1758)	X			X	X					NE	
Gaidropsarus vulgaris (Cloquet, 1824)		X	X		X		X	X		LC	
Moridae											
Gadella maraldi (Risso, 1810)			X	X	X			X	X	LC	
Mora moro (Risso, 1810)			X	X	X					LC	
Lotidae											
Molva dypterygia (Pennant, 1784)			X		X					NE	
Molva macrophthalma (Rafinesque, 1810)				X	X					LC	
Gadidae											
Gadiculus argenteus (Guichenot, 1850)	X	X	X	X	X		X	X		NE	
Micromesistius poutassou (Risso, 1826)			X	X	X	X	X			LC	TS
Trisopterus luscus (Linnaeus, 1758)	X	X						X		NE	
Merlucciidae											
Merluccius merluccius (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/2304_79577995

Trachyrincidae											
Trachyrincus scabrus (Rafinesque, 1810)	X		X		X	X	X	X		LC	
Macrouridae											
Coelorinchus coelorhyncus (Risso,1810)	X		X	X	X	X	X	X		LC	
Hymenocephalus italicus (Giglioli, 1884)				X	X					LC	Cohen et al., 1990
Nezumia aequalis (Günther, 1878)			X	X	X					LC	
Nezumia sclerorhynchus (Valenciennes, 1838)			X	X	X					LC	
Ophidiiformes											
Ophidiidae											
Benthocometes robustus (Goode & Bean, 1886)			X	X	X					LC	
Ophidion barbatum (Linnaeus, 1758)	X	X	X	X	X	X	X	X		LC	TS
*Ophidion rochei (*Müller, 1845)				X	X	X	X			DD	Nielsen, 1986
Parophidion vassali (Risso, 1810)	X				X			X		DD	ES
Carapidae											
Carapus acus (Brünnich, 1768)	X	X	X	X	X				X	LC	
Echiodon dentatus (Cuvier, 1829)				X	X			X		LC	
Bythitidae											
Cataetyx laticeps (Koefoed, 1927)					X					LC	Nielsen, 1986
Trachichthyiformes											
Trachichthyidae											
Gephyroberyx darwinii Johnson, 1866			X		X					LC	IS
*Hoplostethus mediterraneus (*Cuvier,1829)	X	X	X	X	X	X	X	X		LC	
Batrachoidiformes											
Batrachoididae											
Halobatrachus didactylus (Bloch & Schneider, 1801)	X	X	X		X			X		LC	
Scombriformes											
Scombridae											
Acanthocybium solandri (Cuvier, 1832)					X					LC	
Auxis rochei (Risso, 1810)			X	X	X	X	X		X	LC	TS
Auxis thazard (Lacepède, 1800)					X	**NR**	X		X	LC	Q
Euthynnus alletteratus (Rafinesque, 1810)	X	X	X	X	X	X	X	X	X	LC	TS
Katsuwonus pelamis (Linnaeus, 1758)			X		X	X	X		X	LC	TS
Orcynopsis unicolor (Geoffroy Saint-Hilaire, 1817)	X	X	X		X			X	X	LC	

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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*Sarda sarda (*Bloch, 1793)	X	X	X	X	X	X	X	X	X	LC	TS
Scomber colias (Gmelin, 1788)	X	X	X		X	X	X	X	X	LC	TS
Scomber scombrus (Linnaeus,1758)		X	X	X	X	X	X		X	LC	TS
Thunnus alalunga (Bonnaterre, 1788)					X	X	X		X	LC	TS
Thunnus albacares (Bonnaterre, 1788)						**NR**	X			LC	IS
Thunnus obesus (Lowe, 1839)						**NR**	X			VU	IS
Thunnus thynnus (Linnaeus, 1758)	X	X	X	X	X	X	X		X	LC	TS
Bramidae											
Brama brama (Bonnaterre, 1788)	X	X	X		X	X	X	X		LC	RS
Gempylidae											
Ruvettus pretiosus (Cocco, 1833)				X	X					LC	
Nomeidae											
Cubiceps gracilis (Lowe, 1843)			X	X	X					LC	
Psenes pellucidus Lütken, 1880			X		X					LC	IS
Centrolophidae											
Centrolophus niger (Gmelin, 1789)	X		X	X	X	X	X	X		LC	RS
Hyperoglyphe perciformis (Mitchill, 1818)										LC	IS/Benabdi, 2015
Schedophilus medusophagus (Cocco, 1839)					X					LC	Ladoul et al., 2024
Schedophilus ovalis (Cuvier, 1833)					X					NE	Louisy, 2002
Tetragonuridae											
Tetragonurus cuvieri (Risso, 1810)	X		X	X	X			X	X	LC	
Pomatomidae											
Pomatomus saltatrix (Linnaeus, 1766)	X		X	X	X	X	X	X	X	VU	RS
Stromateidae											
Stromateus fiatola (Linnaeus, 1758)	X		X	X	X			X	X	LC	
Trichiuridae											
Lepidopus caudatus (Euphrasen, 1788)	X		X	X	X			X		DD	
Trichiurus lepturus (Linnaeus, 1758)			X		X					LC	
Syngnathiformes											
Centriscidae											
Macroramphosus scolopax (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	
Fistulariidae											
Fistularia commersonii Rüppell, 1838				X	X					LC	IS Kara and Oudjane 2009

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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Syngnathidae											
Hippocampus algiricus (Kaup, 1856)					X			X		VU	Lourie et al., 1999
*Hippocampus guttulatus (*Cuvier, 1829)	X		X		X		X	X	X	DD	
Hippocampus hippocampus (Linnaeus, 1758)	X			X	X	X	X	X	X	DD	Dawson, 1986
Minyichthys sentus (Dawson, 1982)					X					DD	Dawson, 1986
Nerophis lumbriciformis (Jeyns, 1835)								X		LC	
Nerophis maculatus (Rafinesque, 1810)	X	X	X		X			X		DD	
Nerophis ophidion (Linnaeus, 1758)	X		X		X			X		LC	
Syngnathus abaster (Risso, 1827)	X		X	X	X			X	X	LC	
Syngnathus acus (Linnaeus, 1758)	X		X	X	X			X		LC	
Syngnathus phlegon (Risso, 1827)			X		X					LC	
Syngnathus typhle (Linnaeus, 1758)	X		X	X	X			X	X	LC	
Dactylopteriformes											
Dactylopteridae											
Dactylopterus volitans (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Callionymiformes											
Callionymidae											
Callionymus lyra (Linnaeus, 1758)	X	X	X	X	X			X		LC	
Callionymus maculatus (Rafinesque, 1810)			X	X	X					LC	
Callionymus pusillus (Delaroche, 1809)	X	X	X		X					LC	
Callionymus risso (Lesueur, 1814)				X	X			X		LC	
Synchiropus phaeton (Günther, 1861)			X	X	X			X		LC	
Mulliformes											
Mullidae											
*Mullus barbatus (*Linné, 1758)		X	X	X	X	X	X	X	X	LC	TS
*Mullus surmuletus (*Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Kurtiformes											
Apogonidae											
Apogon imberbis (Linnaeus, 1758)	X		X	X	X	X	X	X	X	LC	SD
Gobiiformes											
Gobiidae											
Aphia minuta (Risso, 1810)		X	X		X			X		LC	
Deltentosteus collonianus (Risso, 1820)			X	X	X					LC	

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/2304_79577995

Deltentosteus quadrimaculatus (Valenciennes, 1837)	X	X	X	X	X			X		NE	
Gobius cobitis (Pallas, 1814)	X		X	X		X	X	X	X	NE	
Gobius cruentatus (Gmelin, 1789)	X	X	X	X	X	X	X	X		LC	
Gobius incognitus (Kovačić & Šanda, 2016)			X		X		X		X	NE	
Gobius geniporus (Valenciennes, 1837)			X	X	X	X	X			LC	ES
*Gobius niger (*Linnaeus, 1758)	X	X	X	X	X	X	X	X		LC	TS
Gobius ophiocephalus (Pallas, 1814)			X		X	X	X			LC	ES
Gobius paganellus (*Linnaeus*, 1758*)*	X	X	X	X	X	X	X	X	X	LC	
Gobius vittatus (Vinciguerra, 1883)			X		X		X			LC	
Lesueurigobius friesii (Malm, 1874)			X	X	X		X			LC	
Lesueurigobius sanzi (de Buen, 1918)			X							LC	
Lesueurigobius suerii (Risso, 1810)	X	X	X		X			X		LC	
Pomatoschistus marmoratus (Risso, 1810)			X		X			X	X	LC	
Pomatoschistus microps (Krøyer, 1838)			X		X					LC	
Pomatoschistus minutus (Pallas, 1770)	X	X	X		X			X		LC	
Pomatoschistus pictus (Malm, 1865)			X					X		LC	
Zebrus zebrus (Risso, 1827)			X		X					LC	ES
Carangaria/Misc											
Sphyraenidae											
Sphyraena flavicauda Rüppell, 1838										NE	IS/Kara and Bourehail, 2020
Sphyraena sphyraena (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Sphyraena viridensis Cuvier,1829				X	X	X	X	X	X	LC	IS/Kara and Bourehail, 2003
Polynemidae											
Galeoides decadactylus (Bloch, 1795)			X		X					NT	IS
Pleuronectiformes											
Citharidae											
Citharus linguatula (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Pleuronectidae											
Platichthys flesus (Linnaeus, 1758)					X					LC	
Scophthalmidae											
Lepidorhombus boscii (Risso, 1810)			X	X	X			X	X	LC	
Lepidorhombus whiffiagonis (Walbaum, 1792)			X	X	X				X	LC	

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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Scophthalmus maximus (Linnaeus, 1758)	X	X	X	X	X	X	X		X	LC	TS
Scophthalmus rhombus (Li(naeus, 1758)			X	X	X	X	X	X		LC	
Zeugopterus norvegicus (Günther, 1862)					X					LC	Louisy, 2002
Zeugopterus regius (Bonnaterre, 1788)					X					LC	Bauchot, 1987
Bothidae											
Bothus podas (Delaroche,1809)		X	X	X	X	X	X	X	X	LC	TS
Arnoglossus imperialis (Rafinesque, 1810)			X	X	X					LC	
Arnoglossus laterna (Walbaum, 1792)			X	X	X					LC	
Arnoglossus rueppelii (Cocco, 1844)			X	X	X			X		LC	
Arnoglossus thori (Kyle, 1913)			X	X	X					DD	
Soleidae											
Bathysolea profundicola (Vaillant, 1888*)*			X	X	X	X	X	X		LC	TS
Buglossidium luteum (Risso, 1810)	X	X	X	X	X	X	X	X		LC	
Dagetichthys lusitanicus (de Brito Capello, 1868)					X				X	DD	Louisy, 2002
Dicologlossa cuneata (Moreau, 1881)			X	X	X			X		LC	
Dicologlossa hexophthalma (Bennett, 1831*)*										LC	IS/Massuti et al., 2004
Microchirus azevia (de Brito Capello, 1867)			X		X			X		DD	
Monochirus hispidus Rafinesque, 1814	X	X	X	X	X			X		LC	
Microchirus ocellatus (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	DD	
Microchirus theophila (Risso, 1810)	X	X								DD	
Microchirus variegatus (Donovan, 1808)	X		X	X	X			X		LC	
Pegusa impar (Bennett, 1831)				X	X	X	X			NE	
Pegusa lascaris (Risso, 1810)	X	X	X	X	X	X	X		X	LC	TS
Pegusa nasuta (Pallas, 1814)	X	X			X	X	X	X		NE	
Solea senegalensis Kaup, 1858				X	X	X	X		X	DD	IS
Solea solea (Linnaeus, 1758)		X	X	X	X	X	X			DD	TS
Synapturichthys kleinii (Risso, 1827)			X	X	X	X	X	X	X	DD	RS
Cynoglossidae											
Symphurus ligulatus (Cocco, 1844)				X						LC	IS/Massuti et al.,2003
Symphurus nigrescens (Rafinesque, 1810)		X	X	X	X	X	X	X		LC	

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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Carangiformes											
Carangidae											
Campogramma glaycos (Lacepède, 1801)			X	X	X		X			LC	
Caranx crysos (Mitchill, 1815)				X	X				X	LC	Bauchot, 1987
Caranx fischeri (Smith-Vaniz & Carpenter, 2007)					X					LC	
Caranx hippos (Linnaeus, 1766)					X					LC	
Caranx lugubris Poey, 1860		X								LC	
Caranx rhonchus (Geoffroy St-Hilaire, 1817)	X				X	X	X	X	X	LC	Bauchot, 1987
Lichia amia (Linné, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Naucrates ductor (Linnaeus, 1758)	X	X	X		X					LC	
Peudocaranx dentex (Bloch & Schneider, 1801)	X				X	X	X	X		LC	Berry and Smith-Vaniz, 1978.
Seriola dumerili (Risso,1810)	X		X	X	X	X	X	X	X	LC	TS
Seriola fasciata (Bloch, 1793)					X				X	LC	IS/Louisy, 2002
Scyris alexandrina (Geoffroy Saint-Hilaire, 1817)					X					LC	Bauchot, 1987
Trachinotus ovatus (Linnaeus,1758)	X	X		X	X	X	X	X	X	LC	Bauchot, 1987
Trachurus mediterraneus (Steindachner,1868)			X	X	X	X	X	X	X	LC	TS
Trachurus picturatus (Bowdich,1825)			X	X	X	X	X			LC	TS
Trachurus trachurus (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	VU	TS
Echeneidae											
*Echeneis naucrates (*Linnaeus, 1758)	X		X		X			X	X	LC	
Remora brachyptera (Lowe, 1839)					X					LC	Bauchot, 1987
Remora osteochir (Cuvier, 1829)					X					LC	Bauchot, 1987
Remora remora (Linnaeus, 1758)		X	X	X	X					LC	
Coryphaenidae											
*Coryphaena equiselis (*Linnaeus, 1758)			X		X	X	X			LC	
*Coryphaena hippurus (*Linnaeus, 1758)	X		X			X	X		X	LC	
Istiophoridae											
Istiophorus albicans (Latreille, 1804)					X					NE	Nakamura, 1985
Kajikia albida (Poey, 1860)					X	X	X			LC	RS
Tetrapturus belone (Rafinesque, 1810)		X			X	X	X			LC	ES

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Tetrapturus georgii (Lowe, 1841)					X					DD	
Xiphiidae											
Xiphias gladius (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS
Atheriniformes											
Atherinidae											
Atherina boyeri (Risso, 1810)	X	X	X	X	X	X	X	X	X	LC	TS
Atherina hepsetus (Linnaeus,1758)	X	X	X	X	X			X	X	NE	
Atherinomorus forskali (Rüppel, 1838)										NE	
Atherina presbyter (Cuvier, 1829)	X	X	X		X					LC	
Cyprinodontiformes											
Aphaniidae											
Aphanius fasciatus (Valenciennes, 1821)					X			X	X	LC	
Beloniformes											
Exocoetidae											
Cheilopogon heterurus (Rafinesque, 1810)			X	X	X	X	X	X		LC	
*Exocoetus volitans (*Linnaeus, 1758)	X	X	X	X	X	X	X			LC	
Hirundichthys rondeletii (Valenciennes, 1847)			X		X	X	X	X	X	LC	
Scomberesocidae											
*Scomberesox saurus (*Walbaum, 1792)			X	X	X	X	X			LC	TS
Belonidae											
Belone belone (Linnaeus, 1760)	X	X	X		X	X	X	X	X	LC	TS
*Belone svetovidovi (*Collette & Parin, 1970)			X		X					NE	
Hemiramphidae											
Hemiramphus far (Fabricius, 1775)										NE	IS/Kara et al., 2012
Hyporhamphus picarti (Valenciennes, 1847)	X	X			X			X		LC	
Mugiliformes											
Mugilidae											
Chelon auratus (Risso, 1810)	X	X	X	X	X	X	X			LC	TS
Chelon labrosus (Risso, 1826)	X	X	X	X	X	X	X	X	X	LC	TS
Chelon ramada (Risso, 1827)	X	X	X	X	X	X	X	X	X	LC	TS
Chelon saliens (Risso, 1810)	X	X	X	X	X	X	X			LC	TS
Mugil cephalus (Linnaeus, 1758)	X	X	X	X	X	X	X		X	LC	TS
Oedalechilus labeo (Cuvier, 1829)			X		X	X	X		X	LC	
Gobiesociformes											
Gobiesocidae											
Apletodon dentatus (Facciolà, 1887)	X		X		X			X		NE	

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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Diplecogaster bimaculata (Bonnaterre, 1788)	X		X		X			X		LC	
Gouania willdenowi (Risso, 1810)					X					LC	ES
Lepadogaster candolii (Risso, 1810)	X		X		X			X	X	LC	
Lepadogaster lepadogaster (Bonnaterre, 1788)	X		X		X			X	X	LC	
Opeatogenys gracilis (Canestrini, 1864)			X		X				X	LC	
Blenniiformes											
Tripterygiidae											
Tripterygion melanurus (Guichenot, 1850)	X	X	X		X				X	LC	
Tripterygion tartessicum (Carreras-Carbonell, Pascual & Macpherson, 2007)					X				X	LC	
Tripterygion tripteronotum (Risso, 1810)	X		X	X	X			X		LC	ES
Clinidae											
Clinitrachus argentatus (Risso, 1810)	X	X	X		X			X	X	LC	
Blenniidae											
Aidablennius sphynx (Valenciennes, 1836)	X	X	X		X			X	X	LC	
Blennius ocellaris (Linnaeus, 1758)	X	X	X	X	X			X	X	LC	
Coryphoblennius galerita (Linnaeus, 1758)	X	X	X	X	X			X	X	LC	
Hypleurochilus bananensis (Poll, 1959)					X					LC	
Lipophrys trigloides (Valenciennes, 1836)	X	X	X	X	X			X	X	LC	
Microlipophrys canevae (Vinciguerra, 1880)	X				X				X	LC	
Microlipophrys dalmatinus (Steindachner & Kolombatović, 1883)					X					LC	
Microlipophrys nigriceps (Vinciguerra, 1883)				X	X					LC	ES/ Derbal and Kara, 2001
Parablennius gattorugine (Linnaeus, 1758)	X	X	X	X	X			X	X	LC	
Parablennius incognitus (Bath, 1968)					X				X	LC	
Parablennius pilicornis (Cuvier, 1829)					X			X	X	LC	
Parablennius sanguinolentus (Pallas, 1814)	X		X	X	X			X	X	LC	
Parablennius tentacularis (Brünnich, 1768)	X	X		X	X			X		LC	

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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Parablennius zvonimiri (Kolombatović, 1892)				X	X				X	LC	ES/Derbal and Kara, 2001
Salaria basilisca (Valenciennes, 1836)			X		X					LC	
Salaria pavo (Risso, 1810)	X	X	X	X	X			X	X	LC	
Salarias fasciatus (Bloch, 1786)		X								LC	Red Sea + Indo-Pacific
Salariopsis fluviatilis (Asso, 1901)	X							X		NE	Freshwater
Scartella cristata (Linnaeus, 1758)		X	X	X	X			X	X	LC	
Ovalentaria/Misc											
Pomacentridae											
Chromis chromis (Linnaeus,1758)	X		X	X	X	X	X	X	X	LC	SD
Acanthuriformes											
Lobotidae											
Lobotes surinamensis (Bloch, 1790)					X	X	X		X	LC	RS
Caproidae											
Capros aper (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	RS
Acanthuridae											
Acanthurus monroviae Steindachner, 1876					X					LC	Q/Hemida *et al.*, 2004
Siganidae											
Siganus luridus (Rüppell, 1829)										LC	IS/Chalabi, 1999
Luvaridae											
Luvarus imperialis Rafinesque, 1810							X		X	LC	IS/Gerovasileiou et al., 2017
Lophiiformes											
Lophiidae											
Lophius budegassa (Spinola, 1807)			X	X	X	X	X	X	X	DD	TS
Lophius piscatorius (Linnaeus,1758)	X	X	X	X	X	X	X			LC	TS
Chaunacidae											
Chaunax pictus Lowe, 1846					X					LC	IS/Ragonese & Giusto, 1997
Tetraodontiformes											
Tetraodontidae											
Ephippion guttifer (Bennett, 1831)			X	X	X					LC	IS
Lagocephalus lagocephalus (Linnaeus, 1758)			X		X					LC	
Lagocephalus sceleratus (Gmelin, 1789)					X					LC	IS/Refes and Semahi, 2014
Sphoeroides pachygaster (Müller & Troschel, 1848)					X	X	X			LC	IS/Hemida et al. 2009
Balistidae											
Balistes capriscus (Gmelin, 1789)	X	X	X	X	X	X	X	X	X	VU	TS
Molidae											
Mola mola (Linnaeus, 1758)	X	X	X	X	X	X	X		X	VU	SD

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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Ranzania laevis (Pennant, 1776)					X					LC	
Centrarchiformes											
Kyphosidae											
Kyphosus sectatrix (Linnaeus, 1758)					X					LC	Hemida et al., 2004
*Kyphosus vaigiensis (*Quoy & Gaimard, 1825)						**X**				LC	IS/Groud et al., 2021
Acropomatiformes											
Polyprionidae											
Polyprion americanus (Bloch & Schneider, 1801)		X	X	X	X	X	X			DD	RS
Epigonidae											
Epigonus denticulatus (Dieuzeide, 1950)			X	X	X			X		LC	
Epigonus telescopus (Risso, 1810)	X		X	X	X			X		LC	
Acropomatidae											
Acropoma japonicum (Günther, 1859)										LC	IS/Hannachi et al., 2015
Eupercaria/Misc											
Sparidae											
Boops boops (Linné, 1758)	X	X	X	X	X	X	X		X	LC	TS
Centracanthus cirrus (Rafinesque, 1810)			X	X	X	X	X			LC	TS
Dentex dentex (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	VU	TS
Dentex gibbosus (Rafinesque, 1810)	X	X	X	X	X	X	X	X	X	LC	TS
Dentex macrophthalmus (Bloch, 1791)	X	X	X	X	X	X	X		X	LC	TS
Dentex maroccanus (Valenciennes, 1830)			X	X	X	X	X	X	X	LC	TS
Diplodus annularis (Linnaeus,1758)	X	X	X	X	X	X	X		X	LC	TS
Diplodus cadenati de la Paz, Bauchot & Daget, 1974						**NR**	X			LC	IS
Diplodus cervinus (Lowe, 1838)			X	X	X	X	X	X	X	LC	TS
Diplodus fasciatus (Valenciennes, 1830)	X									LC	Cape Verde
Diplodus noc (Valenciennes, 1830)	X	X						X		LC	Red Sea, very rare.
Diplodus puntazzo (Cetti,1777)	X	X	X	X	X	X	X	X	X	LC	TS
Diplodus sargus (Linnaeus, 1758).	X	X	X	X	X	X	X	X	X	LC	TS
Diplodus vulgaris (GeoffroySaint-Hilaire, 1817)	X	X	X	X	X	X	X	X	X	LC	TS
Lithognathus mormyrus (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
*Oblada melanura (*Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Pagellus acarne (Risso,1827)	X	X	X	X	X	X	X	X	X	LC	TS

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/2304_79577995

Pagrus auriga (Valenciennes, 1843)	X	X	X	X	X	X	X	X	X	LC	RS
Pagellus bellottii Steindachner, 1882			X	X	X	X	X		X	LC	IS
Pagellus bogaraveo (Brunnich, 1768)	X	X	X	X	X	X	X	X	X	NT	TS
*Pagrus caeruleostictus (*Valenciennes, 1830)			X	X	X	X	X			LC	RS
Pagellus erythrinus (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Pagrus pagrus (Linnaeus, 1758)	X		X	X	X	X	X		X	LC	TS
*Sarpa salpa (*Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
*Sparus aurata (*Linnaeus, 1758)	X	X	X	X	X	X	X		X	LC	TS
Spicara flexuosum (Rafinesque, 1810)			X	X	X	X	X	X		NE	TS
Spicara maena (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Spicara smaris (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Spondyliosoma cantharus (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Moronidae											
*Dicentrarchus labrax (*Linné, 1758)	X	X	X	X	X	X	X		X	LC	TS
*Dicentrarchus punctatus (*Bloch, 1792)			X	X	X	X	X		X	LC	TS
Callanthiidae											
Callanthias ruber (Rafinesque, 1810)			X	X	X	X	X			LC	SD
Haemulidae											
Parapristipoma octolineatum (Valenciennes,1833)	X	X	X		X	X	X	X	X	LC	RS
Plectorhinchus mediterraneus (Guichenot, 1850)	X	X	X		X			X		DD	
Pomadasys incisus (Bowdich, 1825)		X	X	X	X	X	X	X	X	LC	RS
Pomadasys stridens (Forsskål, 1775)										LC	IS/Chalabi, 1999
Sciaenidae											
Argyrosomus regius (Asso, 1801)	X	X		X	X	X	X		X	LC	TS
Sciaena umbra (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	NT	TS
*Umbrina canariensis (*Valenciennes, 1843)				X	X	X	X	X		LC	TS
*Umbrina cirrosa (*Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	VU	TS
Umbrina ronchus (Valenciennes, 1843)				X	X	X	X			DD	
Cepolidae											
Cepola macrophthalma (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS

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DOI: http://dx.doi.org/10.15666/aeer/2304_79577995

Labridae											
Acantholabrus palloni (Risso, 1810)			X	X	X	X	X			LC	RS
Centrolabrus melanocercus (Risso, 1810)		X	X	X	X		X	X		LC	ES
Coris julis (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	SD
Ctenolabrus rupestris (Linnaeus, 1758)	X	X	X	X	X					LC	
Labrus bergylta Ascanius, 1767		X		X						LC	
Labrus merula (Linnaeus, 1758)		X	X	X	X			X	X	LC	
Labrus mixtus (Linnaeus, 1758)	X	X	X		X			X		LC	
*Labrus viridis (*Linnaeus, 1758)	X	X	X	X	X			X	X	VU	
Lappanella fasciata (Cocco, 1833)			X	X	X					LC	
Symphodus bailloni (Valenciennes, 1839)	X									LC	
Symphodus cinereus (Bonnaterre, 1788)			X	X	X					LC	
Symphodus doderleini (Jordan, 1890)			X	X	X					LC	ES
Symphodus mediterraneus (Linnaeus, 1758)	X		X	X	X	X	X	X		LC	
Symphodus melops (Linnaeus, 1758)	X	X	X	X	X	X	X			LC	
Symphodus ocellatus (Linnaeus, 1758)	X	X	X	X	X	X	X			LC	
Symphodus roissali (Risso, 1810)		X	X	X	X	X	X		X	LC	
Symphodus rostratus (Bloch, 1791)	X	X	X	X	X	X	X	X		LC	
Symphodus tinca (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	SD
Thalassoma pavo (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	SD
Xyrichtys novacula (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Scaridae											
Sparisoma cretense (Linnaeus, 1758)			X		X	X	X		X	LC	SD
Priacanthidae											
Priacanthus arenatus (Cuvier, 1829)					X					LC	
Perciformes/Percoidei											
Trachinidae											
Echiichthys vipera (Cuvier, 1829)	X		X	X	X	X	X	X	X	LC	TS
*Trachinus araneus (*Cuvier, 1829)	X	X	X	X	X	X	X		X	LC	TS
Trachinus draco (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS
*Trachinus radiatus (*Cuvier, 1829)	X	X	X		X	X	X		X	LC	

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Perciformes/Uranoscopoidei											
Uranoscopidae											
Uranoscopus scaber (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS
Ammodytidae											
Gymnammodytes cicerelus (Rafinesque, 1810)			X		X					LC	
Perciformes/Serranoidei											
Epinephelidae											
Epinephelus aeneus (E. Geoffroy St.-Hilaire, 1817)			X	X	X	X	X	X		NT	TS
*Epinephelus caninus (*Valenciennes, 1843)			X	X	X	X	X		X	DD	TS
*Epinephelus costae (*Steindachner, 1878)			X	X	X	X	X		X	DD	TS
*Epinephelus marginatus (*Lowe, 1834)	X	X	X	X	X	X	X	X	X	VU	TS
Hyporthodus haifensis (Ben-Tuvia, 1953)					X					LC	
*Mycteroperca rubra (*Bloch, 1793)	X		X	X	X	X	X		X	LC	TS/SD
Anthiadidae											
Anthias anthias (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	SD
Serranidae											
Cephalopholis taeniops (Valenciennes, 1828)						**NR**				LC	IS
*Serranus atricauda (*Gunther,1874)			X		X	X	X			DD	TS
*Serranus cabrilla (*Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS
Serranus hepatus (Linnaeus, 1758)	X	X	X	X	X	X	X	X		LC	TS
Serranus scriba (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS
Perciformes/Scorpaenoidei											
Scorpaenidae											
Pontinus kuhlii (Bowdich, 1825)					X	X	X			DD	Bauchot, 1987
Scorpaena elongata (Cadenat, 1943)				X	X	X	X		X	LC	TS
*Scorpaena loppei (*Cadenat, 1943)				X	X					LC	Bauchot, 1987
Scorpaena maderensis (Valenciennes, 1833)					X				X	LC	Bauchot, 1987
*Scorpaena notata (*Rafinesque,1810)			X	X	X	X	X	X	X	LC	TS
Scorpaena porcus (Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS
Scorpaena scrofa (Linnaeus,1758)	X	X	X	X	X	X	X		X	LC	TS
Sebastidae											
Helicolenus dactylopterus (Delaroche,1809)	X	X	X	X	X	X	X	X	X	LC	TS
Trachyscorpia cristulata (Goode & bean, 1896)					X					DD	IS/Massuti et al., 1993

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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Triglidae											
Chelidonichthys cuculus (Linnaeus, 1758)			X	X	X	X	X		X	LC	TS
Chelidonichthys lastoviza (Bonnaterre, 1788)	X	X	X		X	X	X		X	LC	
Chelidonichthys lucerna (Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	
Chelidonichthys obscurus (Walbaum, 1792)			X	X	X	X	X			LC	TS
Eutrigla gurnardus (Linnaeus, 1758)			X	X	X	X	X			NE	
Lepidotrigla cavillone (Lacepède, 1801)	X	X	X	X	X	X	X	X		LC	
Lepidotrigla dieuzeidei (Blanc & Hureau, 1973)				X	X		X			LC	
*Trigla lyra (*Linnaeus, 1758)	X	X	X	X	X	X	X	X	X	LC	TS
Peristediidae											
*Peristedion cataphractum (*Linnaeus,1758)	X	X	X	X	X	X	X	X	X	LC	TS
Perciformes/Cottoidei											
Liparidae											
Eutelichthys leptochirus (Tortonese, 1959)					X					DD	
Perciformes/Gasterosteoidei											
Gasterosteidae											
Gasterosteus aculeatus Linnaeus, 1758								X		LC	
46 orders											
126 families											
258 genera											
411 species	**174**	**154**	**268**	**249**	**378**	**184**	**193**	**202**	**167**		
						6 NR					

Data compiled from literature, specimens in collection in main museums (MNHN, BMNH, USNM, ZMO), Fishbase and iNaturalis, along with IUCN status
NR: new records, IUCN status, NE: Not evaluated, DD: Data deficient, LC: Least concern, NT: Near-threatened, VU: Vulnerable, CR: Critically endangered, IS: Introduced species, ES: Endemic species, RS: Rare species, TS: Trade species, Q: Questionable species, SD: Species seen in the dive, LEK: Confirmed by local inventory

This table contains 411 species of 258 genera, 126 families and 46 orders. In comparison, FishBase (consulted in October 2024) lists 380 bony fishes from Algeria.

The most affected families are the following: Sparidae with 27 species, Gobiidae and Labridae with 18 species, Blenniidae and Myctophidae wih 17 species, Carangidae and Scombridae with 15 species and Syngnathidae with 10 species (*Fig. 3*). Altogether these 9 families totalize 150 species i.e. 37, 8% of the total number of bony fishes in the Algerian waters.

The IUCN Red List status of these ichthyofauna (*Table 3*) include 2 species estimated as “Critically Endangered” (CR), 1 species “Endangered” (EN), 11 species “Vulnerable” (VU), 4 species “Near Threatened” (NT), 337 species “Least Concern” (LC), 30 species “Data Deficient” (DD) and 26 species “Not Evaluated” (NE).

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Figure 2. *Distribution of bony fish based on their biogeographical origins*

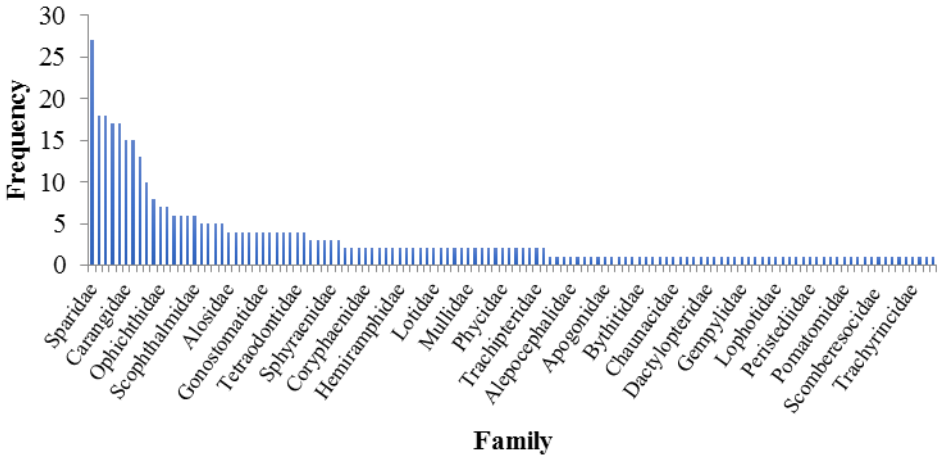

Figure 3. *Number of species by family of bony fishes of the Algerian waters*

Table 3. *IUCN Red List status of the species of bony fishes of the Algerian waters*

IUCN Red List category	Number of species	%
Not Evaluated (NE)	26	6.3
Data Deficient (DD)	30	7.3
Least Concern (LC)	337	81.9
Near Threatened (NT)	4	1.0
Vulnerable (VU)	11	2.7
Endangered (EN)	1	0.2
Critically Endangered (CR)	2	0.5
	411	100

According the FAO fishery statistics, the main commercial fish species for Algeria available for 2021 are the following: the European pilchard *Sardina pilchardus* (29,926 t), sardinellas *Sardinella* spp. (23,290 t), the swordfish *Xiphias gladius* (3241 t), the blue whiting *Micromesistius poutassou* (2732 t), jacks *Trachurus* spp. (2500 t), the bullet tuna *Auxis rochei* (1802 t), the Atlantic bluefin tuna *Thunnus thynnus* (1650 t), the European anchovy *Engraulis encrasicolus* (1204 t) for a total catch of about 79,000 t.

Several factors have contributed to the evolution of the ichthyofauna of the Algerian coast: Climate change: Rising sea temperatures and changes in ocean currents have favored the expansion or decline of certain species, Anthropogenic pressure: Intensive

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fishing, coastal urbanization and marine pollution have had a major impact on certain fish populations and introduction of non-native species: Exotic species have been reported, probably introduced through shipping (ballast water) or aquaculture.

Historical and rare records of marine bony fishes in Algerian waters

Historical records of marine ichthyofauna in Algeria provide essential information on long-term trends in biodiversity, changes in species range and the impact of anthropogenic and environmental factors on marine ecosystems. Analysis of historical data dating back to 1850 (*Table 2*) highlights the early documentation of several species, in particular by Guichenot (1850), Bourjot (1870), and Dieuzeide (1954-1963). These early studies serve as fundamental references for understanding species persistence, local extinctions, and range expansions over nearly two centuries. Grimes et al. (2018) compiled historical data (from 1927 to 2017) on introduced species in Algerian marine waters (*Table 4; Fig. 4*) and listed 23 bony fish species. Other introduced species have been recorded by Babali (2017), Mouzai Tifoura and Bennoui (2017), and more recently by Kara and Bourehail (2020) and Groud et al., 2021 (*Table 4; Fig. 4*) who recorded *Sphyraena flavicauda* and *Kyphosus vaigiensis* (*Fig. 5B*) respectively.

Table 4. *List of introduced marine species of bony fishes in Algerian waters since 1927 to 2024, including recent new records (present study)*

Marine bony fishes introduced to Algeria	Year	Status	Origin	Locality in Algeria	References
Galeoides decadactylus (Bloch, 1795)	1927	R.exp.	E. Atl.	Gulf of Oran	Dieuzeide, 1927 in Grimes et al., 2018
Ephippion guttife r (Bennett, 1831)	1933	R.exp.	E. Atl. + W. Med.	Ténès	Dieuzeide, 1933 in Grimes et al., 2018
Pisodonophis semicinctus (Richardson, 1848)	1954	R.exp.	E. Atl. + W. Med.	Cherchell	Dieuzeide and Roland, 1957 in Grimes et al., 2018
Gephyroberyx darwinii (Johnson, 1866)	1955	R.exp.	Circumglobal	Cherchell	Dieuzeide and Roland, 1958 in Grimes et al., 2018
Psenes pellucidus Lütken, 1880	1955	R.exp.	Circumglobal	Bou Ismail Bay	Dieuzeide and Roland, 1955 in Grimes et al., 2018
Halosaurus ovenii Johnson, 1864	1960	R.exp.	E. Atl.	Cherchell	Dieuzeide, 1963 in Grimes et al., 2018
Pagellus bellottii Steindachner, 1882	1960	R.exp.	E. Atl. + Gibraltar strait	Algiers	Dieuzeide, 1960 in Grimes et al., 2018
Trachyscorpie cristulata (Goode & Bean, 1896)	1982	R.exp.	E. Atl. + W. Med.	Ghazaouet	Maurin pers. com. 1982 in Massuti et al., 1993 and in Grimes et al., 2018
Solea senegalensis Kaup, 1858	1984	R.exp.	E. Atl. + W. Med.	Eastern Algeria	Alili and Marinaro, 1986 in Grimes et al., 2018
Chaunax pictus Lowe, 1846	1997	R.exp.	Atl.	Sentinelle Bank	Ragonsese and Giusto, 1997
Pomadasys striden s (Forsskål, 1775)	1999	Alien	Indian Ocean	Algeria	Chalabi, 1999 in Grimes et al., 2018
Siganus luridus (Rüppell, 1829)	1999	Alien	W. Indian Ocean	Algeria	Chalabi, 1999 in Grimes et al., 2018
Acanthurus monroviae Steindachner, 1876	2001	R.exp.	E. Atl. + W. Med.	Bou Ismail Bay	Hemida et al., 2004a in Grimes et al., 2018
Seriola fasciata (Bloch, 1793)	2002	R.exp.	Atl. + Med.	Algeria	Louisy, 2002
Sphyraena viridensis Cuvier, 1829	2003	R.exp.	E. Atl. + E. Med	Gulf of Annaba	Kara and Bourehail, 2003 in Grimes et al., 2018
Symphurus ligulatus (Cocco, 1844)	2003	R.exp.	E. Atl.	Algeria	Massuti et al., 2003 in Grimes et al., 2018

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Atherinomorus forskalii (Rüppell, 1838)	2004	Alien	W. Indian Ocean	Bou Ismail Bay	Massuti et al., 2004 in Grimes et al., 2018
Dicologlossa hexophthalma (Bennett, 1831)	2004	R.exp.	E. Atl. + W. Med.	Gulf of Arzew	Massuti et al., 2004 in Grimes et al., 2018
Lesueurigobius sanzi (de Buen, 1918)	2004	R.exp.	E. Atl. + W. Med.	Algeria	Babali, 2017
Fistularia commersonii Rüppell, 1838	2008	Alien	IndoPacific	Gulf of Skikda	Kara and Oudjane, 2009 in Grimes et al., 2018
Sphoeroides pachygaster (Müller & Troschel, 1848)	2009	R.exp.	Circumglobal	Chetaïbi-Seraidi	Hemida et al., 2009 in Grimes et al., 2018
Luvarus impeialis Rafinesque, 1810	2009	R.exp.	Circumglobal	Algiers	Mouzai Tifoura and Bennoui, 2017
Hemiramphus far (Fabricius, 1775)	2010	Alien	IndoPacific + E. Med.	Collo	Kara et al., 2012 in Grimes et al., 2018
Acropoma japonicum Günther, 1859	2011	Alien	IndoPacific	Gulf of Annaba	Hannachi, 2015; Hannachi et al., 2015 in Grimes et al., 2018
Lagocephalus sceleratus (Gmelin, 1789)	2012	Alien	IndoPacific	Algeria	Refes and Semahi, 2014 in Grimes et al., 2018
Hyperoglyphe perciformis (Mitchill, 1818)	2015	R.exp.	North Atl. + W. Med.	Surcouf	Benabdi pers. com., 2015 in Grimes et al., 2018
Etrumeus golanii DiBattista, Randall & Bowen, 2012	2017	Alien	W. Indian Ocean + Med.	Cherchell	Kassar and Hemdia, 2017 in Stamouli et al., 2017 in Grimes et al., 2018
Sphyraena flavicauda Rüppell, 1838	2019	Alien	Indo-Pacific	Gulf of Annaba	Kara and Bourehail, 2020
Kyphosus vaigiensis (Quoy & Gaimard, 1825)	2019	Alien	Indo-Pacific	Sassel	Groud et al., 2021
Auxis thazard (Lacepède, 1800)	2019	R.exp.	Cosmopolitan	Ghazaouet	Present study
Diplodus cadenati De La Paz, Bauchot & Daget, 1974	2019	R.exp.	E. Atl.	Ghazaouet	Present study
Thunnus albacares (Bonnaterre, 1788)	2019	R.exp.	Cosmopolitan	Béni-Saf Ghazaouet	Present study
Thunnus obesus (Lowe, 1839)	2020	R.exp.	Circumglobal	Ghazaouet	Present study
Gaidropsarus granti (Regan, 1903)	2021	R.exp.	E. Atl. + Med.	BénSaf, Cap Blanc	Present study
Cephalopholis taeniops (Valenciennes, 1828)	2024	R.exp.	E. Atl. + Med.	Arzew	Present study

R.exp: range-expanding

Our updated inventory also includes species that have been observed only once, either through historical reports, museum specimens, or recent field studies. In total, 39 species have been categorized as single-record occurrences in Algerian waters (*Fig. 6*). Most (20) of the 36 introduced species (*Table 4*) are Herculean migrants coming from the Atlantic and penetrating the Mediterranean Sea through the Gibraltar Strait (*Fig. 5*). Nine species are Lessepsian migrants coming from the Indo-Pacific region through the Suez Canal. A few (6) have a worldwide distribution, either circumglobal or cosmopolitan (*Fig. 5*). A total of 411 species have been consistently recorded in Algerian waters across historical datasets, museum collections, and modern biodiversity inventories. Notably, *Acipenser sturio* (Linnaeus, 1758), historically present since the 19th century, is now classified as Critically Endangered (CR) according to the IUCN Red List. Other long-standing species such as *Anguilla anguilla* and *Alosa algeriensis* have shown significant population declines, reflecting the combined pressures of habitat degradation, overfishing, and climate change. Conversely, some deep-sea species, such as *Halosaurus ovenii* (first recorded by Dieuzeide in 1963), remain relatively stable (Least Concern, LC), suggesting that deeper habitats may serve as refugia from direct

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human impacts. The continued presence of these species highlights the importance of ongoing monitoring to evaluate possible long-term changes in their populations. Most have recorded during the last two decades thanks to the development of regular surveys related to fisheries and the growing interest to inventory the biodiversity and to protect the national biological heritage.

The study of bony fish in the Mediterranean faces several major limitations. Firstly, grey literature comprising technical reports, theses, and local archives not published in peer-reviewed journals although informative, is often difficult to access, fragmented, and lacks standardization.

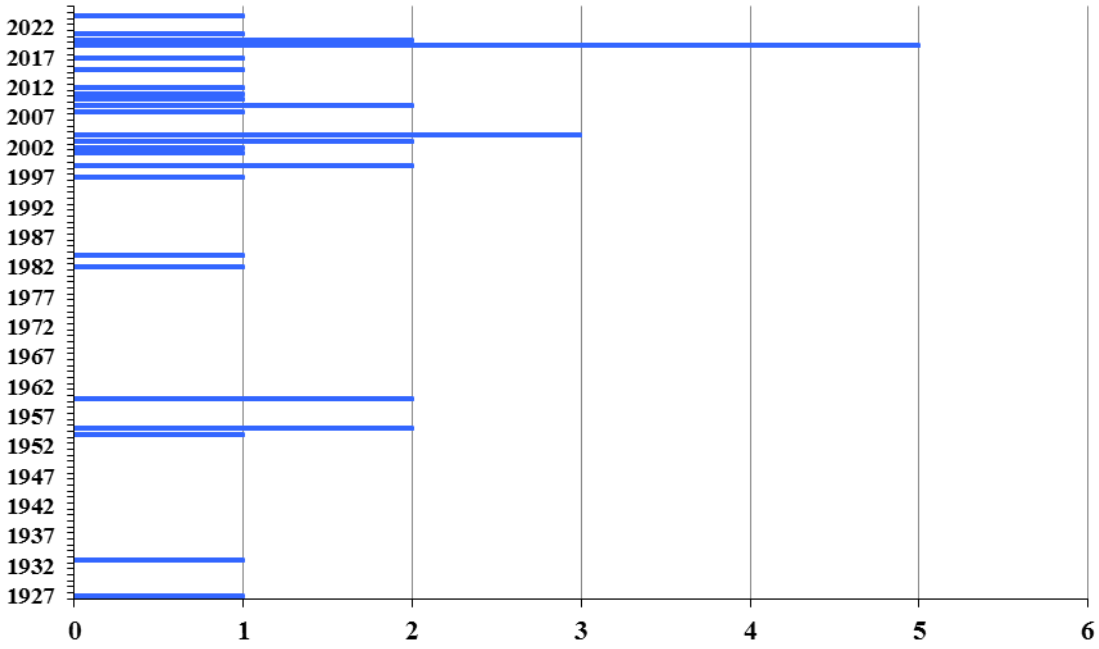

Figure 4. *Abundance by year of the bony fishes introduced in the Algerian Alboran waters*

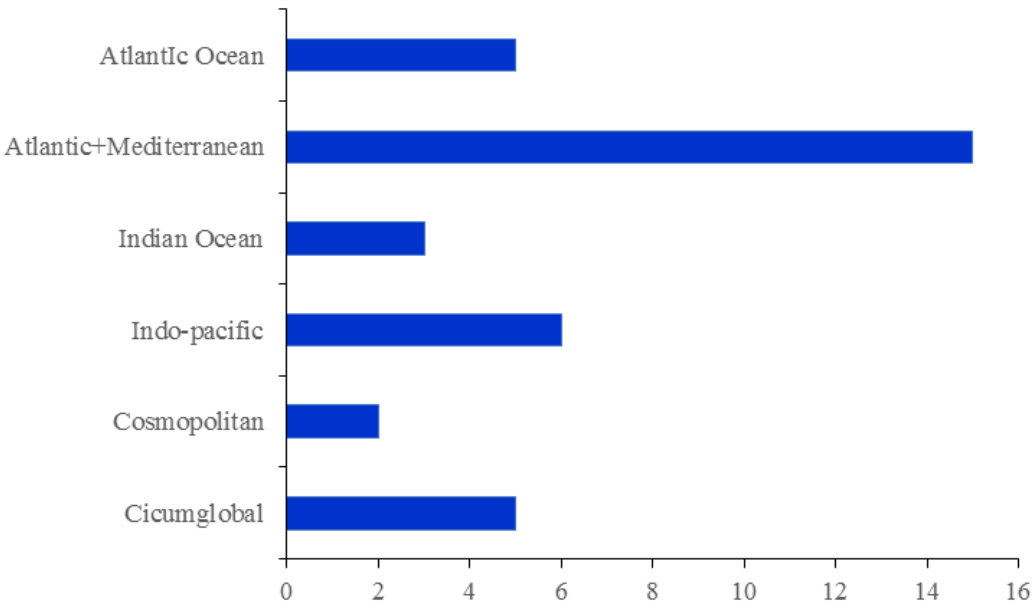

Figure 5. *Origin of the species of bony fishes introduced in the Algerian waters*

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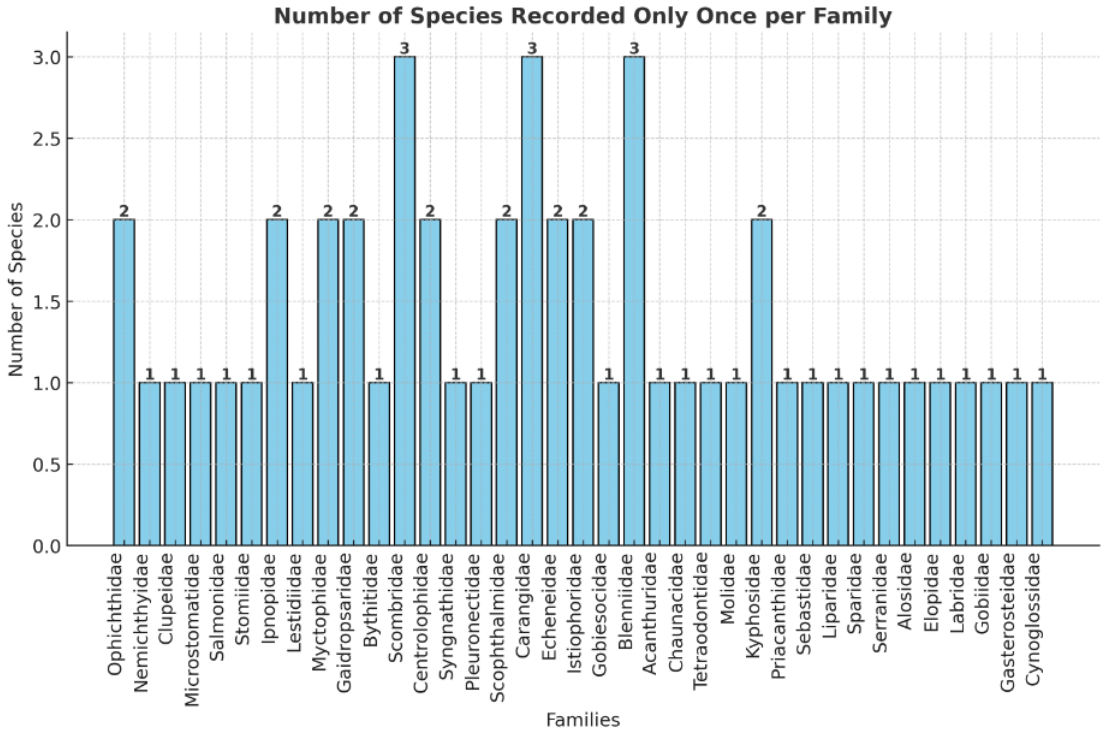

Figure 6. *Bony fish categorized as single-record occurrences in Algerian waters*

Secondly, taxonomic identification of species presents significant uncertainties due to the use of vernacular names, intraspecific morphological variations, and inconsistent taxonomic expertise across the Mediterranean region. These issues increase the risk of misidentification, thereby compromising data quality. Concerning the introduced species, Golani et al. (2021) inventoried 106 exotic species, i.e. 15% of the total Mediterranean fauna (versus 9% for Algeria) with 75% of the species originating from the Indo-Pacific (Lessepsian migrants). The lower rate observed in Algerian waters is due to that the exotic species mostly come from the eastern Atlantic by natural range extension through the Gibraltar Straight.

The Algerian bony fish fauna represents 58.7% of that of the whole Mediterranean Sea (*Table 5*). Compared to the other Mediterranean countries, Algeria has a higher diversity correlated to the length of coast line (related to the surface of the national marine waters), but also to the past and present-day efforts in scientific researches to inventory its fishery resources.

The lack of regular monitoring of species recorded only once remains a limitation of this study. However, this highlights the need for a structured follow-up protocol involving targeted scientific surveys and continued engagement with fishers. Integrating modern techniques, such as environmental DNA (eDNA), could enhance species detection without relying exclusively on accidental captures (Thomsen et al., 2012). The presence of species recorded only once in Algeria highlights gaps in biodiversity knowledge and raises ecological and conservation concerns. Some species may be vagrant or migratory, appearing sporadically due to ocean currents, seasonal movements, or range expansions (Froese and Pauly, 2025). Others may be naturally rare or under-sampled, especially in deep-sea and offshore environments (Coll et al., 2010).

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Figure 7 shows newly documented species recorded during our studies along the Algerian Alboran coast between 2018 and 2025 (*Table 4; Fig. 7).*

Figure 7. *Introduced species recorded between 2018 and 2024 in the Algerian Alboran waters (Photos by H. Alkhalili). A: Diplodus cadenati, B: Kyphosus vaigienis, C: Auxis thazard, D: Thunnus obesus, E: Gaidropsarus granti, F: Cephalopholis taeniops, G-H: Thunnus albacares*

Diplodus cadenati (*Fig. 7A*): The Moroccan white seabream is native from Morocco, Senegal and regions of Europe such as France, Gibraltar, Portugal, and Spain (Fricke et al., 2016). One specimen of 32 mm SL was caught at Ghazaouet on 30th November 2019 by a gill net. The specimen has been preserved in the collections of the University of Oran (Catalog number n°3019-LRSE-Fish-2019).

Kyphosus vaigiensis (*Fig. 7B*): First recorded in Algeria in 2021, previously known from the Atlantic and Indo-Pacific.

Auxis thazard (Frigate tuna) (*Fig. 7C*): A coastal pelagic species, previously recorded in Lebanon and Libya. One specimen of 460 mm SL was caught at Ghazaouet on 30th November 2019 by a trawl net. After measurements and photos were taken, and considering the large size of the species, it was intended for consumption.

Thunnus obesus (bigeye tuna) (*Fig. 7D*) is a cosmopolitan pelagic species, highly migratory, but not recorded from Algerian waters so far. Two specimens of 750 mm SL were caught at Ghazaouet on 18th December 2020 by a trawl net. After measurements

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and photos were taken, and considering the large size of the species, they were intended for consumption.

Gaidrosparus granti (Azores rockling) (*Fig. 7E-F*) is an Atlantic species, but a few specimens have been recorded in the central Mediterranean by Pais et al. (2008), Orsi Relini and Relini (2014). Three specimens of 370 mm, 320 mm, 270 mm SL were caught a Béni-Saf on the 20th February 2021 and at Cap Blanc on the 20th July 2022 by trawl net and trolling fishing. The specimens have been preserved in the collections of the University of Oran (Catalog number n° 2021-LRSE-Fish-2022).

Thunnus albacares (Yellowfin tuna) (*Fig. 7 H, G*): A cosmopolitan pelagic species, highly migratory; it was first documented in the Mediterranean in Cyprus waters in October 1993 (Tsagarakis et al., 2021), but it had not been previously included in Algerian fish records. Two specimens of 440 mm and 510 mm SL were caught at Béni-Saf on 30th November 2019 and at Ghazaouet on 7th December 2019 by a trawl net. After measurements and photos were taken, and considering the large size of the species, there were intended for consumption.

Cephalopholis taenipops (bluespotted bass) (*Fig. 7I*) is a coastal eastern Atlantic species. In the Mediterranean, this species was first recorded in Libya in 2002 (Ben Abdallah et al., 2007) and has since spread to the eastern Mediterranean. It was recently reported in Almeria, Spain (Stern et al., 2019; Langeneck et al., 2023). One specimen of 380 mm SL was caught in the Gulg of Arzew on 8th July 2024 by a trolling fishing by an amateur fisherman who intended to keep the specimen for his own consumption.

Table 5. *Number of bony fish species in the national waters of main Mediterranean countries, compared (in %) to the whole Mediterranean fauna (data extracted from FishBase), and length of cost line of these countries*

Country	Number of bony fish species in Mediterranean waters	%	Length of coast line in km
Algeria	411	58.7	998
Tunisia	279	39.9	1 148
Libya	235	33.6	1 770
Lebanon	261	37.3	225
Syria	291	41.6	193
Tùrkie	422	60.3	7 200
Greece	432	61.7	13,676
Italia	446	63.7	7 600
Spain	460	65.7	1660 (MED)
Mediterranean Sea	700	100.0	

Many of these species are widely distributed across the Mediterranean and Atlantic, suggesting Algeria serves as a transitional zone for fish dispersal. However, the lack of recent records raises concerns about habitat degradation, climate change, and overfishing potentially driving local extinctions (Ben Rais Lasram et al., 2010). Historical records dominate the dataset, highlighting the necessity for modern surveys to reassess species presence. From a conservation perspective, the absence of follow-up records suggests that some species may face localized extinction risks due to low

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population sizes (Dulvy et al., 2014). Marine Protected Areas (MPAs) and sustainable fisheries management could help preserve these populations if still present.

Algeria thus occupies an intermediate position, sharing temperate species with Spain and Tunisia, but less influenced by the subtropical species of Atlantic Morocco. A gradual topicalization has been observed everywhere, linked to climate change.

Conclusion

This study underscores the dynamic and evolving nature of fish biodiversity in the Western Mediterranean, particularly along the Algerian coast. By integrating historical records with contemporary field surveys, we reveal significant shifts in species composition, driven by oceanographic changes, anthropogenic pressures, and climate variability. The increasing presence of subtropical and non-native species, especially in areas like Ghazaouet Bay, points to the combined influence of Atlantic inflows and Lessepsian migration.

Algeria's marine ecosystems, shaped by both Mediterranean and Northeast Atlantic characteristics, are experiencing complex biodiversity patterns, including the emergence of commercially relevant non-native species and the decline of native ones due to habitat degradation and overfishing. These findings highlight the urgent need for coordinated, long-term monitoring efforts that incorporate fisheries-independent data, molecular tools, and citizen science initiatives.

The practical implications are clear: enhancing surveillance of invasive species, leveraging GIS technologies, and fostering regional collaboration are critical to understanding and mitigating biodiversity changes. This study provides a foundational reference for future research and offers actionable insights to support marine conservation strategies and sustainable fisheries management in Algeria.

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