

Species

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Checklist and Distribution of Exotic Teleost Fish Species Arrived in Syrian Marine Water (Eastern Mediterranean) during the Period 2018-2025

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ABSTRACT

This article provides an updated review of the exotic fish species (Teleostei/Osteichthyes) which are recorded for the first time in Syrian marine water (eastern Mediterranean), during the period 2018-2025. Fifty exotic fish species belonging to 45 genera and 35 families are recorded. Compared to the previous decades, a dramatic increase (>7 species year⁻¹) occurred in the number of the exotic fish species arrived into Syrian marine water during the studied period. Apogonidae and Sparidae were the richest families with species records (4 species each), followed by Ophichthidae (3 species), then by Labridae, Mullidae, Priacanthidae, Serranidae, Scombridae, Scorpaenidae and Tetraodontidae (2 species each). The remaining families are represented by one species each. Out of these, 6 species (12%) have "established" themselves in Syrian marine water (*Jaydia smithi*, *Heniochus intermedius*, *Fistularia petimba*, *Platycephalus indicus*, *Pterois volitans* and *Epinephelus areolatus*) as they are recorded at least three separate times, and in different places in the area. Other species are "casual", i.e. those species that are recorded twice (4 species, 8%) or once (40 species, 80%). Other information, such as species spread, fishing location, fishing gears, and global distribution, are given.

Keywords: Syrian coast, Mediterranean Sea, Fish migration; First records; Exotic species, Species expansion, Tropicalization

1. INTRODUCTION

The Mediterranean Sea suffers from ongoing biological problems, stemming mainly from the impact of various human activities and the resulting pollutants (Carreño and Lloret, 2021). The opening of the Suez Canal and its recent enlargement are the central issues of these problems, as they assist the marine organisms to cross into the Mediterranean (Lessepsian migration), particularly its eastern part (Galil *et al.*, 2015). Climate changes should not be overlooked, as they accelerate the migration of fish species through the Suez Canal, Strait of Gibraltar, and from Black Sea and the

western Mediterranean to the eastern part (Khalil *et al.*, 2025). This has led to an increase in the introduction of marine biota into the Mediterranean; some of which have successfully colonized in the eastern Mediterranean Sea (Evans, 2023; Bottacini *et al.*, 2024). The introduction of exotic species has prompted researchers to document these species and monitor their behavior in the aim of mitigating their negative impacts (Katsanevakis *et al.*, 2023). Therefore, preparing periodic checklists of fish species along the Mediterranean countries helps researchers to identify the latest introduced species, monitor their occurrence, and develop adequate plans to limit their negative impacts (Galanidi *et al.*, 2023).

The number of exotic fish species previously recorded in Syrian marine waters had increased gradually (Golani, 2025). As a cumulative record, it is recognized that it reached 37 species by 2005 (Saad, 2005), 42 species by 2010 (Ibrahim, 2011), 46 species by 2011 (Alsheikh Ahmed, 2011), 56 species by 2018 (Ali, 2018), and 101 species (besides 5 species of Chondrichthyes) by the end of August 2023 (Saad and Khrema, 2023).

This article tends to highlight the status of the exotic species arrived in Syrian marine water (eastern Mediterranean) during the period 2018 (year of the last specialized and comprehensive inventory; Ali, 2018) till 2025, with the aims of: 1. complementing the list of new fish arriving in the Syrian marine waters, 2. highlighting the established species in the new region, 3. revealing the species distribution by space (along various locations of the Syrian coast), and by time (from year to year). This information helps in fisheries research, conservation efforts, and management issues.

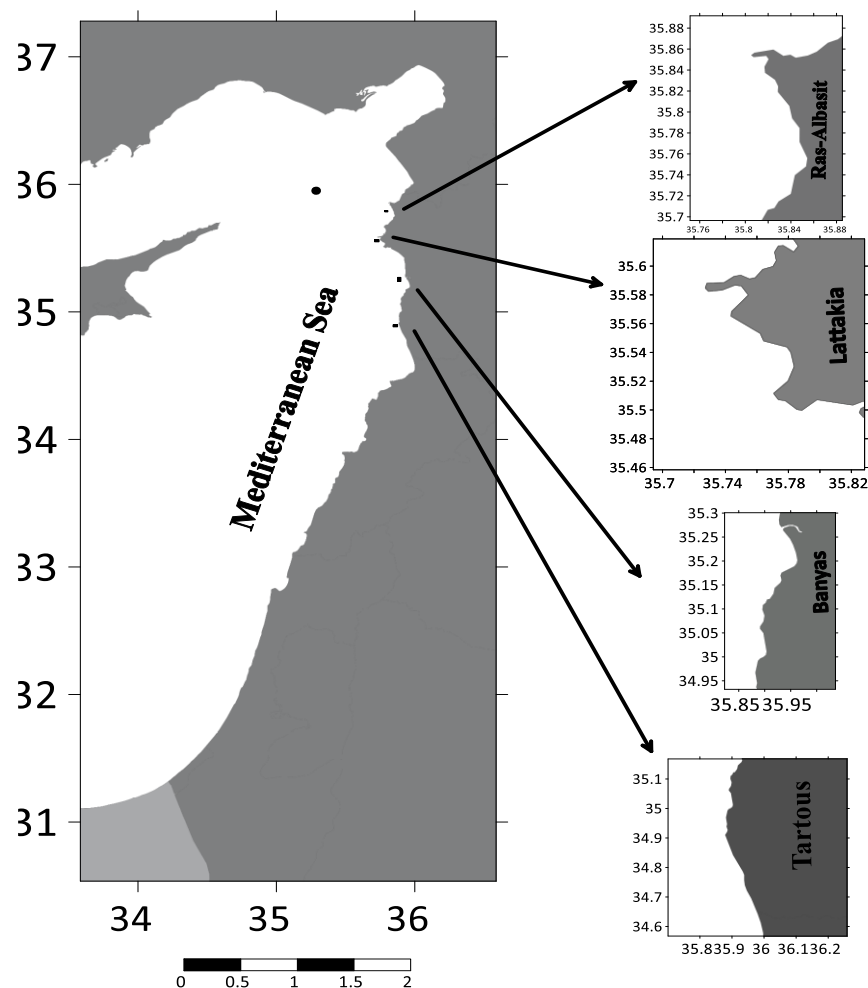


Figure 1. Main sampling sites along the Syrian coast (eastern Mediterranean).

2. MATERIALS AND METHODS

Data was collected from the documented scientific articles of specialized scientific journals published since the last checklist of Ali (2018) to cover those species belonging to Teleostei (Osteichthyes): sea lamprey, *P. marinus* (Petromyzonidae) was the only exception because of its strong association with fish catch. Some species recorded before 2018 were referred to when required. Taxons were

arranged in an alphabetical order, and exotic species were placed in 2 categories (Zenetos *et al.*, 2010): "established" (recorded at least three successive times, spread over time and space) and "casual" (recorded no more than twice). When available, the data presented for each exotic species included scientific and common names, related references, fish standard length (SL) or weight, fishing depth and gear, fishing time and location (Fig. 1), and global distribution. No attention was given to the introduction method or route, as the available data is insufficient. Basionyms of the original authors were put in parentheses only when a species is reclassified or removed to a different genus or rank.

3. RESULT AND DISCUSSION

Fifty exotic fish species belonging to 45 genera and 35 families have been reported, as during the period 2018-2025; sixteen of these are recorded by the Authors. They are as follows:

3.1. APOGONIDAE

a. *Jaydia queketti* (Gilchrist, 1903)

The Spotted cardinal fish, *J. queketti*, was first recorded by Alshawy *et al.* (2019a) in March 2019. A specimen (SL = 76mm) was caught off Banyas coast (35.1435.11°N, E35.5512°E), at a depth of ~50 m, using fixed gillnets (18mm mesh size). The species was reconfirmed by Ibrahim *et al.* (2019a), where 8 individuals (mean SL=75±0.4mm) were caught on July 9, 2019, in the same site, using the same fishing gear. It is native to the Red Sea, Indian Ocean, and Pacific Ocean.

b. *Jaydia smithi* Kotthaus, 1970

The Smith's cardinalfish, *J. smithi*, was first recorded on May 2, 2016, by Alshawy *et al.* (2017). Five specimens (mean SL= 92.2±6.67mm) were collected from Ibn-Hani area, north of Latakia city (35.3514°N, 35.4312°E), using gillnet of 15 mm mesh size, at a depth of 35 m, above a soft sandy bottom.

A second record was reported on September 18, 2019, by Ibrahim *et al.* (2020a), off Banyas coast (N35°14'35.11", E35°55'12"), where three specimens (mean SL=94.5±1.7mm) were caught using a fixed gillnet (18mm mesh size) at ~30m water depth.

The third occurrence was documented by Ali *et al.* (2024a) off Jableh coast (35.2202°N, 35.5345°E), where one specimen (SL=100mm) was collected on August 8, 2022, using a fixed bottom gill net, at a depth of 10 m.

This species is an Indo-Pacific one: found in the Red Sea, north to southern China and southern Taiwan, south to Indonesia. It is an established species in Syrian marine water.

c. *Apogon atradorsatus* Heller & Snodgrass, 1903

The Blacktip cardinalfish, *A. atradorsatus*, was first recorded by Alshawy *et al.* (2019b). Two specimens (mean SL=68mm) were caught on January 20, 2019, off the coast of Banyas city (35.143511°N", 35.55125°E), at a depth of 17m, using longline fishing. It is native to the southeast Pacific Ocean.

d. *Ostorhinchus fasciatus* (White, 1790)

The Broadbanded cardinalfish, *O. fasciatus*, was first recorded by Alshawy *et al.* (2019c), on March 21, 2019. Two specimens (mean SL = 69mm) were caught at 40-60m water depths off Banyas coast (35.14511°N, 35.5512°E), at a depth of ~50 m, using fixed gillnets. It is native to the tropical and subtropical waters.

3.2. ATHERINIDAE

Atherinomorus lacunosus (Forster, 1801)

The Hardyhead silverside, *A. lacunosus*, was first recorded by Othman *et al.* (2022), in November 2021. Eleven specimens (mean SL = 6.5±0.52) were captured using purse-seine nets in Ras Albasit (35.5146°N, 35.4812°E). It is found in the Indo-Pacific Ocean and the Red Sea.

3.3. BALISTIDAE

Odonus niger (Rüppell, 1836)

The Red-toothed triggerfish, *O. niger*, was first recorded by Ali *et al.* (2024b) on September 13, 2024. Two specimens (SL = 161 and 144mm) were caught off Banyas city (35.1112°N, 35.5518°E), at a depth of 15m above a rocky bottom, using a metal pot. This species is native to the Indo-West Pacific.

3.4. BELONIDAE

Ablennes hians (Valenciennes, 1846)

The Flat needlefish, *A. hians*, was first recorded by Alshawy *et al.* (2019d), on February 18, 2019. Two specimens (SL= 445 and 502mm) were caught using gillnet (18 mm mesh size), off Banyas coast (N35.143511°N, 35.55125°E). It is native to the tropical and subtropical waters; including the Atlantic Ocean, Indian Ocean, and Pacific Ocean.

3.5. BREGMACEROTIDAE

Bregmaceros nectabanus Whitley, 1941

Twelve individuals of Smallscale codlet *B. nectabanus* (mean SL = 34.17 ± 9.14mm) were reported for the first time by Stern *et al.* (2019). These individuals were found in the stomachs of the Atlantic horse mackerel *Trachurus trachurus* caught with purse seine nets from Burj Islam (35.684436 °N, 35.783768 °E) and Ras Albasit (35.850647°N, 35.839896 °E) during the period 16/8/2018 to 31/12/2018. The species is native to Western Atlantic: it is reported from southeast Caribbean, Morocco to Namibia, South Africa and the Mediterranean Sea, Indian Ocean and tropical western Pacific to Fiji.

3.6. CALLIONYMIDAE

Synchiropus phaeton (Günther, 1861)

A single female individual of Phaeton dragonet, *S. phaeton*, (SL = 61mm) was reported for the first time by Grech *et al.*, (2023). It was caught in June 2023 by trawl net, from a depth of 100m, above a muddy bottom, off Ras Albasit (35.8524°N, 35.8378°E). Its main habitats are the eastern Atlantic Ocean and the Mediterranean Sea.

3.7. CARANGIDAE

Naucrates ductor (Linnaeus, 1758)

The Pilotfish, *N. ductor*, was first recorded by AliBasha *et al.* (2021) on September 25, 2020. A specimen (SL = 261mm) was captured by purse-seine nets at a depth of 60m, off Latakia coast. This species exhibits semi-obligate commensalism with large marine organisms such as larger fish, turtles, and marine mammals: it feeds on their food scraps and on small invertebrates. Its native habitats extend across tropical and subtropical oceans.

3.8. CENTROLOPHIDAE

Schedophilus ovalis (Cuvier, 1833)

The Imperial blackfish, *S. ovalis*, was first recorded by Badran and Ghanem (2024) in February 3, 2024. Four specimens (SL range = 158-325mm) were captured in Ibn Hani area (35.3542°N, 35.4544°E), using a metal pot at a depth of 8m above a rocky seabed. The species has an expanded distribution range from the western to eastern Mediterranean. Its native habitat is the eastern Atlantic, from Spain to South Africa, as well as the Red Sea and the Canary Islands.

3.9. CHAETODONTIDAE

Heniochus intermedius Steindachner, 1893

The Red Sea bannerfish, *H. intermedius*, was first recorded by Ibrahim *et al.* (2022), on May 21, 2022. One specimen (SL=92mm) was captured off Banyas coast (35°14'35.11N,35°55'12E), at a depth of 14m in a mixed-bottom area of sand and rocks.

A second specimen (140 mm) was reported by Saad *et al.* (2022a) on May 18, 2022, off Banyas coast (35. 70517°N, 35. 541473°E). Again, a third specimen (192 mm) was recorded by Alnesser *et al.* (2025), on 21/8/2024, off the coast of Latakia city (35.31597°N, 35.4248°E). This species has established itself in Syrian marine water. It is native to the Indo-West Pacific Ocean.

3.10. DOROSOMATIDAE***Sardinella gibbosa* (Bleeker, 1849)**

Two individuals of the Goldstripe sardinella, *S. gibbosa*, (SL = 145 and 145mm) were caught on July 30, 2022, off Ras AlBassit coast (35.8524°N, 35.8378°E), by Fortič *et al.* (2023). It spreads across the tropical Indo-West Pacific, and the Red Sea .

3.11. EPIGONIDAE***Epigonus denticulatus* Dieuzeide, 1950**

The Pencil cardinalfish, *E. denticulatus*, was first documented by Ibrahim *et al.* (2023), on January 25, 2023. A specimen (SL = 120mm) was caught at a depth of 320m, off Banyas coast (35.31597°N, 35.424857°E), using gillnet (16mm openings). The species originally spreads along western and central Pacific, in the western and eastern Atlantic, along the west and southern African coast, the Indian Ocean, and western Mediterranean.

3.12. FISTULARIIDAE***Fistularia petimba* Lacepède, 1803**

The Red cornetfish, *F. petimba*, was first recorded by Hussein *et al.* (2019), on July 29, 2019. A single specimen (SL = 448mm) was caught off Latakia coast (35.31597°N, E35.424857°E), at a depth of 45m, using fixed gillnets.

A second record (3 individuals; Mean SL = 499mm) was recorded by Ibrahim *et al.* (2020c) from two sites (one individual off Banyas coast (35.14'35.11°N, 35°55'12°E), at ~30m water depth on 24/9/2019, and two individuals off Latakia coast, at ~45m water depth (35.315.97°N, 35.424857°E), on 29/9/2019. This species has established itself in Syrian marine water. Its original habitats are the Atlantic Ocean, Indo-Pacific region, and the Red Sea.

3.13. GOBIIDAE***Gobius geniporus* Valenciennes, 1837**

The Slender goby, *G. geniporus*, was first recorded by Saad *et al.* (2022b), on February 21, 2021. One individual (SL = 70mm) was captured off Banyas coast (35.2515°N, 35.3420°E), at a depth of 13m, using a fishing hook. This record enhances the understanding of the local species distribution, and fills the gap of its distribution between the Lebanese and Turkish coasts. It is an endemic species to the western Mediterranean and was not found before in any other area.

3.14. ISTIOPHORIDAE***Tetrapturus belone* Rafinesque, 1810**

The Mediterranean spearfish, *T. belone*, was first recorded by Saad *et al.* (2024) on November 6, 2022. A single specimen (SL = 945mm) was captured, using a longline, in marine waters south of Banyas coast (35.06144°N, 35.53080°E). The species is likely to have expanded its distribution range towards the northern and eastern Mediterranean waters. Its native habitat is only the Mediterranean Sea.

3.15. LABRIDAE**a. *Pteragogus trispilus* Randall, 2013**

Four specimens of Sideburn wrasse, *P. trispilus* (mean SL = 72±3mm), were caught from a depth of ~20-30m off Banyas coast (35.143511°N, 35.5512°E), using a fixed gillnet (18mm mesh size), by Ibrahim *et al.* (2019b). This species was recorded (2 individuals) in Syrian marine water in 2014; it is mistakenly identified as *P. pelycus* (Soliman *et al.*, 2014) and such misidentification was corrected by Ali (2018). The original habitat of this species is Western Indian Ocean and the Red Sea.

b. *Symphodus bailloni* (Valenciennes, 1839)

The Baillon's wrasse, *S. bailloni*, was first recorded by Khrema *et al.* (2022), on May 29, 2022. Two specimens (SL = 93 and 96mm) were captured off Banyas coast (35.71105°N, 35.54 14 73° E), using spear fishing.

Another individual (SL = 110mm) was recorded by Alnesser *et al.* (2025) on 21/8/2024, off Latakia coast (35.31597°N, 35.424857°E). The species distribution includes the eastern Atlantic, from the North Sea to Morocco and Mauritania, and some dispersed areas in the Mediterranean Sea.

3.16. LEIOGNATHIDAE

Equulites popei (Whitley, 1932)

The species Pope's ponyfish, *E. popei*, was first recorded in Syrian marine waters (35.31597°N, 35.424857°E) by Ibrahim *et al.* (2020b), on January 10, 2020. One specimen (SL = 92mm) was caught using a gillnet, off Banyas coast, at a depth of ~35m. Its distribution range includes the coastal waters from East Africa, the Red Sea, the Philippines, Japan, Thailand, and southern Malaysia.

3.17. LOPHOTIDAE

Lophotus lacepede Giorna, 1809

The Crested oarfish, *L. lacepede*, was recorded for the first time by Ali *et al.* (2021), on June 14, 2021. A single specimen (SL = 701mm) was caught using a commercial longline baited with sardine, approximately 19km off Banyas coast (35.1115°N, 35.4350°E). This species is most likely to have expanded its distribution range from the western to the eastern Mediterranean. Its native habitat includes the eastern Atlantic, the Red Sea, and the Indian Ocean.

3.18. LUTJANIDAE

Lutjanus fulviflamma (Forsskål, 1775)

This Dory snapper, *L. fulviflamma*, was first recorded by Saad *et al.* (2022c), on September 20, 2022. A single specimen (SL=195mm) was caught using a beach seine at a water depth of 7m, off Banyas coast (35.12522°N, 35.56561°E). Its habitats include the tropical regions of the Indian Ocean and the Red Sea.

3.19. MACROURIDAE

Nezumia aequalis (Günther, 1878)

The common Atlantic grenadier, *N. aequalis*, (Weight=3.88g) was first recorded by Grech *et al.*, (2023). A single individual was caught with a trawl net off Ras Albasit coast (35.8524°N, 35.8378°E), on January 17, 2023. This benthopelagic fish has a broad distribution range, along the Atlantic Ocean and the Mediterranean Sea.

3.20. MULLIDAE

a. *Parupeneus rubescens* (Lacepède, 1801)

The Rosy goatfish, *P. rubescens*, was first recorded by Sabour and Masri (2022), on May 21, 2020. One specimen (SL = 154mm) was captured using a trammel net at a depth of 120m off Ras AlBasit coast (35.5011°N, 35.5011°E). It is of the Indo-Pacific origin.

b. *Parupeneus spilurus* (Bleeker, 1854)

The Blackspot goatfish, *P. spilurus*, (SL = 72.5mm) was first recorded by Baddour *et al.* (2025). A single individual was found in the stomach of a *Fistolaria commersonii* fish caught on November 26, 2023, off the coast of Latakia province. It has a wide Indo-Pacific distribution, inhabiting sandy estuaries and reefs of the tropical to temperate habitats.

3.21. OPHICHTHIDAE

a. *Ophisurus serpens* (Linnaeus, 1758)

The Serpent eel, *O. serpens*, was first recorded by Alshawy *et al.* (2019e) on May 19, 2019. A single specimen (SL = 1975mm) was caught off Banyas coast (N35.1435 11°N, 35.5512°E), at a depth of ~220m, using a fixed gillnet. Presence of this species in the Syrian coast fills the gap of its distribution along the eastern Mediterranean coast. This provides further evidence of the exotic species continuous invasion into the area. The species is found in the eastern Atlantic Ocean, the western Mediterranean, the western Indian Ocean, and New Zealand.

b. *Dalophis imberbis* (Delaroche, 1809)

The Armless snake eel, *D. imberbis*, was first recorded by Capapé *et al.* (2021), on April 25, 2020. A specimen (TL = 260mm) was caught with a hand net, off Tartous coast (35.8693°E 34.9039°N), at a depth of 13m above rocky bottom. This record confirms the species presence in the Levant Basin, and marks the easternmost extension range in the Mediterranean Sea. Its native habitat includes the eastern Atlantic Ocean and the Mediterranean Sea.

c. *Echelus myrus* (Linnaeus, 1758)

The Painted eel, *E. myrus*, was first recorded by Khrema *et al.* (2023) in June 3, 2023. One specimen (TL = 591mm) was captured by hook-and-line at a depth of 9m off Jableh coast (35.22 123° N, 35.54508°E). This species was previously reported from the Syrian marine water (Sbaihi, 1994), but no specimen was available for confirmation. Again, this species did not appear in the previous Syrian checklists (Saad, 2005; Ali, 2018). This record fills the gap in the species distribution between the coast of Lebanon and that of Turkey. Its habitats include the eastern Atlantic Ocean and the Mediterranean Sea.

3.22. OPHIDIIDAE***Ophidion rochei* Müller, 1845**

The Roche's Snake blenny, *O. rochei*, was first recorded by Othman *et al.* (2020) on March 2019. A specimen (SL=141mm) was caught using a bottom trawl, off the coast of Ras Albasit (35.5146°N, 35.4812°E), above sandy bottoms, and at depths of ~150 m. Its distribution range covers the western and northern regions of the Mediterranean and the Black Sea.

3.23. POMACANTHIDAE***Pomacanthus maculosus* (Forsskål, 1775)**

The Yellowbar angelfish, *P. maculosus*, was first recorded by Capapé *et al.* (2023). A diver witnessed the first specimen, and captured the second (SL=222mm) using a spear gun at a water depth of 3m, off Banyas coast (35.143511°N, 35.55125°E). The species distribution range includes the Red Sea, the Arabian Gulf, the Gulf of Oman, and the western Indian Ocean:

3.24. POMACENTRIDAE***Abudefduf vaigiensis* (Quoy & Gaimard, 1825)**

The Indo-Pacific sergeant fish, *A. vaigiensis*, was first recorded on October 1, 2019 by Saad *et al.* (2020a). One specimen (SL=118mm) was caught, using a fishing gun at a depth of 4m southeast of Arwad Island (34.4917°N, 35.5237°E). Its native habitat is the Indo-Pacific region, where it primarily inhabits tropical and warm waters.

3.25. PETROMYZONIDAE***Petromyzon marinus* Linnaeus, 1758**

The Sea lamprey, *P. marinus*, was first recorded by Saad *et al.* (2021), on July 28, 2020. A single specimen (TL=350mm) was captured off the northern coast of Jableh city (35.2515°N, 35.3420°E), at a depth of 30m, above a sandy seabed that partially covered with algae, gravel and rocks. This species expanded its range to the easternmost of the Mediterranean Sea. It is originally found in the north-western Atlantic Ocean and in some freshwater habitats.

3.26. PLATYCEPHALIDAE***Platycephalus indicus* (Linnaeus, 1758)**

The Bartail flathead, *P. indicus*, was first recorded in 2002 (Saad, 2005), and no additional occurrences have been reported since that date until another specimen was captured, on August 31, 2020, by Hammoud *et al.* (2020). It is caught using a spear gun above a sandy bottom at a depth of 8m and about 800m off Banyas coast (35.1011°N; 35. 5454°E). It was then recorded by Hussein *et al.* (2021) on December 21, 2020, where a single specimen (SL=335mm) was caught using a gillnet, at a depth of ~25m, off Banyas coast (35.14351°N, 35.55126°E). Its native habitat is the Indo-west Pacific, the Red Sea and the east Africa, till Philippines, Japan and Australia.

3.27. PRIACANTHIDAE**a. *Priacanthus sagittarius* Starnes, 1988**

The Arrow bulleye, *P. sagittarius*, was first recorded by Alshawy *et al.* (2019f) on March 15, 2019. A specimen (SL=154mm) was caught off the coast of Banyas city (35.14311°N, 35.55126°E), at a depth of 100m, above a rocky seabed, using a longline. This record highlights the environmental changes in the region, and marks an important addition to the biodiversity of Syrian marine waters. It is native to the tropical and subtropical waters.

b. *Priacanthus hamrur* (Fabricius, 1775)

The Moontail bullseye, *P. hamrur*, was first recorded by Capapé *et al.* (2022) on February 18, 2022. One specimen (SL=164mm) was captured using a bottom fixed net, at a depth of 120m, above a muddy substrate, off Albassiah coast (2km offshore) and south of Banyas city (35.0911°N; 35.5344° E). Its native habitat is the Indo-Pacific Ocean.

3.28. SCOMBRIDAE**a. *Auxis thazard* (Lacepède, 1800)**

The Frigate tuna, *A. thazard*, was first recorded by Othman *et al.* (2023a) in March 2022. A single specimen (TL=421mm) was caught using a purse seine net, off Ras Al-Bassit coast (35.5146°N, 35.4812°E). Its native habitat includes the Indo-Pacific region and the tropical Atlantic Ocean.

b. *Scomber indicus*

The first record of the migrant mackerel fish, *S. indicus*, was found by Othman *et al.* (2023b), in October 2022. A single specimen of this species (SL=202mm) was captured using purse seine nets in Ras Albasit area (35.5146°N, 35.4812°E). Its original distribution is the North Atlantic Ocean and the Mediterranean Sea.

3.29. SCORPAENIDAE**a. *Pterois volitans* (Linnaeus, 1758)**

Six individuals of Red lionfish, *P. volitans*, were collected from 10m water depth by fishing pot and spear fishing, at 3 different occasions (Fandi *et al.* (2022): (a) on 5/9/2024 where 2 individuals (SL=171 and 197mm) were collected off Banyas marina (35.11166°N, 35.56238°E), and one individual (SL=157mm) off Arab Almouk coast (35.15394°N, 35.55467°E). (b) on 11/10/2020, where 2 individuals (SL=168 and 170mm) were collected off Banyas marina and off Arab Almouk coasts, respectively. (c) on 9/11/2020, where one individual (SL=160mm) was caught off Banyas marina. This lionfish has established itself in the area and expected to target the economically important fisheries. It is native to the Indo-Pacific region.

b. *Parascorpaena mcadamsi* (Fowler, 1938)

The McAdam's scorpionfish, *P. mcadamsi*, was first recorded on April 4, 2023, by Ali *et al.* (2025). A single specimen (SL=103mm) was caught off the coast of Banyas city (35.1120°N, 35.5642°E) using a fishing pot, at a depth of 15m over a rocky seabed. Its native habitat is the Indo-Pacific, where the species is widely distributed from South Africa to China, Japan, Australia, Solomon Islands, and Indian waters.

3.30. SYNODONTIDAE***Saurida gracilis* (Quoy & Gaimard, 1824)**

The lizardfish, *S. gracilis*, was first recorded by Bariche *et al.* (2025). Three specimens (SL= 166, 182 and 201mm) were caught during August 2025, using a spear gun, at a depth of 5m, above a mixed sandy and gravelly bottom, and off the sports city of Latakia (35.5632°N, 35.7326°E). This suggests that this species has expanded its distribution range westward, to the eastern Mediterranean. It is originally distributed across the Indo-Pacific region, including the Red Sea, East African coasts, Hawaiian Islands, and the Great Barrier Reef.

3.31. SERRANIDAE**a. *Epinephelus areolatus* (Forsskål, 1775)**

The Areolate grouper, *E. areolatus*, was first recorded by Al Mabruk *et al.* (2021), on May 29, 2019. One specimen (SL = 305mm) was caught with a trolling line, operating at a depth of 61m, off the coast of Latakia (35.32276°N, 35.45042°E). A second specimen was record off Latakia coast, on September 29, 2021, by Hassan and Alchikh Ahmad (2023). A single specimen was caught using trammel nets above a rocky habitat near Arwad Island, south of Tartous city (34.51 518°N, 35°50548°E), at a depth of 15-20m. The third record of this species was reported on July 30, 2022, by Saad *et al.* (2023), using fishing traps, at a depth of 30m off the coast of Ibn Hani-Latakia, (35.3537.3°N, 35.45056°E). A fourth record was a single specimen reported by Ali *et al.* (2023) from the coastal waters off Latakia city. The species has established itself in the area. It is distributed along the Indian and Pacific Oceans, the Arabian Gulf, and the Red Sea.

b. *Epinephelus caninus* (Valenciennes, 1843)

The Dogtooth grouper, *E. caninus*, was recorded by Saad *et al.* (2020b) on February 20, 2018. One specimen (SL=230mm) was captured using a trap net at a depth of 30m off Tartous coast (34.5118°N, 35.50548°E). The native habitat of the species includes the eastern Atlantic Ocean, from Portugal to Angola, and the western Mediterranean Sea.

3.32. SPARIDAE**a. *Acanthopagrus bifasciatus* (Forsskål, 1775)**

The Twobar seabream, *A. bifasciatus*, was recorded for the first time by Saad *et al.* (2022d) on July 3, 2022. One specimen (TL = 330 mm) was captured, using spear fishing, at a depth of 7-8m off Banyas coast (35.7170.5°N, 35.54147°E), on a sandy bottom. Its native habitat includes the Red Sea and the western Indian Ocean.

b. *Pagellus bogaraveo* (Brünnich, 1768)

One specimen (TL = 150 mm) of the Blackspot seabream, *P. bogaraveo*, was recorded by Saad *et al.* (2020c), on April 7, 2019. It was caught by trawl nets in Ras Albassit (35.5010°N, 35.5011°E), on February 25, 2019. Six additional specimens (TL range: 88-112mm) were then caught by gill nets off Jablah coast (35.2111° N, 35.4811°E). The species range of distribution is in the eastern Atlantic: Norway, Strait of Gibraltar to Cape Blanc, in Mauritania, Madeira, Canary Islands, and the western Mediterranean.

c. *Pagrus major* (Temminck & Schlegel, 1843)

The Red seabream, *P. major*, was first recorded by Saad *et al.* (2022e), on September 18, 2019. One specimen was captured using a commercial trammel net, at a depth of 30m, off Tartous coast (35.9110°N-34.8701°E). Its native habitat includes the north-western Pacific Ocean, the north-east of China and Japan.

d. *Rhabdosargus sarba* (Forsskål, 1775)

The Goldlined seabream, *R. sarba*, was first recorded by Hamwi & Ali-Basha (2021), on January 31, 2021. One specimen (SL=131mm) was caught using a bottom trawl net, at a depth of 50-60m, off Latakia coast (35.3111°N, 35.4811°E). It is distributed along the Indian Ocean and the western Pacific, and from the Red Sea to South Africa, Madagascar, the Philippines, Japan, and northern Australia.

3.33. SYNANCEIIDAE***Synanceia verrucosa* Bloch & Schneider, 1801**

The Stonefish, *S. verrucosa*, was recorded for the first time by Ibrahim *et al.* (2019c), on October 12, 2019. One large specimen was collected, off the coast of Latakia city (35.31597°N, 35.424857°E), at a depth of 15m, using longline fishing gear.

A second single specimen (370 mm) was recorded by Khrema (2025), on 21/8/2024, off Latakia coast (35.31597°N, 35.424857°E). The species distribution range is from the Red Sea and east Africa to French Polynesia, and south to Queensland and Australia.

3.34. TETRAODONTIDAE**a. *Lagocephalus lagocephalus* (Linnaeus, 1758)**

The Oceanic puffer, *L. lagocephalus*, was first recorded by Alshawy *et al.* (2019g), on December 20, 2018. A single specimen (SL=436mm) was caught at a depth of 300m off Banyas coast (35.14351°N", 35.55125°E), using bottom longline fishing gear. It is native to the tropical and subtropical waters.

b. *Lagocephalus guentheri* (Miranda Ribeiro, 1915)

The Pacific diamondback puffer, *L. guentheri*, was first recorded by Sabour and Masri (2018). Two adult specimens (SL=175 and 180mm) were caught on November 30, 2016 using a trammel net, off Latakia coast (35.3227°N, 35.4743°E), at depths of 3 and 50m. It is found in the Indo-Pacific region and the Red Sea.

3.35. Trachipteridae

Trachipterus trachipterus (Gmelin, 1789)

The Mediterranean dealfish, *T. trachipterus*, was recorded for the first time by Geraci *et al.* (2022). One specimen (TL=1380mm) was caught on 19-10-2025 by longline fishing, at 850m depth, off Banyas coast (35.143511°N, 35.5512°E). The species is distributed along the eastern Atlantic (including western Mediterranean) and western Pacific.

Detailed numbers of genera and species, within each family, and number of individuals of each recorded species, during the period 2018-2025, are summarized in Tab. (1).

Table 1. Summary table: number of genera and species within each family, and number of individuals of each recorded species during the period 2018-2025

	Family	No. of Genera	No. of species	Species	No. of individuals in each record					remarks	
					1 st	2 nd	3 rd	4 th	5 th		
1.	Apogonidae	3	4	<i>Jaydia queketti</i>	1	8					
				<i>Jaydia smithi</i>	5	3	1				
				<i>Apogon atradorsatus</i>	2						
				<i>Ostorhinchus fasciatus</i>	2						
2.	Atherinidae	1	1	<i>Atherinomorus lacunosus</i>	11						
3.	Balistidae	1	1	<i>Odonus niger</i>	2						
4.	Belonidae	1	1	<i>Ablennes hians</i>	2						
5.	Bregmacerotidae	1	1	<i>Bregmaceros nectabanus</i>	12						
6.	Callionymidae	1	1	<i>Synchiropus phaeton</i>	1						
7.	Carangidae	1	1	<i>Naucrates ductor</i>	1						
8.	Centrolophidae	1	1	<i>Schedophilus ovalis</i>	4						
9.	Chaetodontidae	1	1	<i>Heniochus intermedius</i>	1	1	1				
10.	Dorosomatidae	1	1	<i>Sardinella gibbosa</i>	2						
11.	Epigonidae	1	1	<i>Epigonus denticulatus</i>	1						
12.	Fistulariidae	1	1	<i>Fistularia petimba</i>	1	1	2				
13.	Gobiidae	1	1	<i>Gobius geniporus</i>	1						
14.	Istiophoridae	1	1	<i>Tetrapturus belone</i>	1						
15.	Labridae	2	2	<i>Pteragogus trispilus</i>	2	4				1 st record was in 2014	
				<i>Symphodus bailloni</i>	2	1					
16.	Leiognathidae	1	1	<i>Equulites popei</i>	1						
17.	Lophotidae	1	1	<i>Lophotus lacepede</i>	1						
18.	Lutjanidae	1	1	<i>Lutjanus fulviflamma</i>	1						
19.	Macrouridae	1	1	<i>Nezumia aequalis</i>	1						
20.	Mullidae	1	2	<i>Parupeneus rubescens</i>	1						
				<i>Parupeneus spilurus</i>	1						
				<i>Ophisurus serpens</i>	1						
21.	Ophichthidae	3	3	<i>Dalophis imberbis</i>	1						
				<i>Echelus myrus</i>	1						
				<i>Ophidion rochei</i>	1						
22.	Ophidiidae	1	1	<i>Ophidion rochei</i>	1						
23.	Pomacanthidae	1	1	<i>Pomacanthus maculosus</i>	2						
24.	Pomacentridae	1	1	<i>Abudefduf vaigiensis</i>	1						
25.	Petromyzonidae	1	1	<i>Petromyzon marinus</i>	1						
26.	Platycephalidae	1	1	<i>Platycephales indicu</i>	1	1	1			1 st record	

					was in 2002
27.	Priacanthidae	1	2	<i>Priacanthus sagittarius</i>	1
				<i>Priacanthus hamrur</i>	1
28.	Scombridae	2	2	<i>Auxis thazard</i>	1
				<i>Scomber indicus</i>	1
29.	Scorpaenidae	2	2	<i>Pterois volitans</i>	2 1 1 1 1
				<i>Parascorpaena mcadamsi</i>	1
30.	Serranidae	1	2	<i>Epinephelus areolatus</i>	1 1 1 1
				<i>Epinephelus caninus</i>	1
				<i>Acanthopagrus bifasciatus</i>	1
31.	Sparidae	4	4	<i>Pagellus bogaraveo</i>	1 6
				<i>Pagrus major</i>	1
				<i>Rhabdosargus sarba</i>	1
				<i>Synanceia verrucosa</i>	1 1
32.	Synanceiidae	1	1	<i>Synanceia verrucosa</i>	1 1
33.	Synodontidae	1	1	<i>Saurida gracilis</i>	1
34.	Tetraodontidae	1	2	<i>Lagocephalus lagocephalus</i>	1
				<i>Lagocephalus guentheri</i>	2
35.	Trachipteridae	1	1	<i>Trachipterus trachipterus</i>	1
Total		45	50		

The results (Tab. 1) showed that 50 exotic fish species are encountered for the first time in the marine water of Syria, during the period 2018-2025. These species belong to 45 genera and 35 families. Apogonidae and Sparidae were the richest with exotic species (4 species each), followed by Ophichthidae (3 species), then by Labridae, Mullidae, Priacanthidae, Serranidae, Scombridae, Scorpaenidae, and Tetraodontidae (2 species each). The remaining families are represented by one species each.

Regarding the species status in Syrian marine water (Tab. 1), the 6 species (12%) *Jaydia smithi*, *Heniochus intermedius*, *Fistularia petimba*, *Platycéphales indicus*, *Pterois volitans*, and *Epinephelus areolatus* are recorded at least three successive times, spread over time and space: these species are regarded as "established species" (Zenetos *et al.*, 2010). Species recorded no more than twice are regarded as "casual species", (Zenetos *et al.*, 2010): they include the 4 species that recorded twice (8%; *Jaydia queketti*, *Pteragogus trispilus*, *Pagellus bogaraveo*, and *Synanceia verrucosa*) and those that recorded only one time (80%; the remaining 40 exotic species) (Tab.1).

The number of recorded exotic species in Syrian marine water during the period 2018-2025 had been accelerating with time: previous work revealed the presence of 37 species by the year 2005 (Saad, 2005), 42 species by the year 2010 (i.e. 1 species per year, Ibrahim, (2011), 46 species by the year 2011 (i.e. 2 species per year, Alsheikh Ahmed, 2011) and 56 species by the year 2018 (i.e. 1.5 species per year) (Ali, 2018). This paper shows a dramatic increase in the exotic fish species, where 50 species had been added to the previous list, within 7 years (the period 2018-2025): the average increase exceeds 7 species per year. This dramatic increase coincides with the accelerating effects of climate change on marine waters in the Mediterranean Sea (Dorado-Guerra *et al.*, 2023). Accordingly, the quality of Syrian marine water, as part of the Mediterranean, has been driven by climate change to become more able to accommodate tropical and subtropical fish species (Tropicalization phenomena, Ibrahim, 2011; Hussein *et al.*, 2021).

4. CONCLUSION

Generally, the huge increase in the number of exotic species in the last 7 years may be the result of the severe climate change and the subsequent change in species behaviour, impact of human activities, and the recent enlargement of Suez Canal. Furthermore, the increase in biodiversity monitoring efforts cannot be ruled out as the cause behind that increase. This calls for joint monitoring efforts of exotic species management in the eastern Mediterranean, and advanced techniques are needed for effective technical solutions. Finally, continuous updating of exotic fish checklists is the core issue to facilitate solving the problem.

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Author contributions

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Conflict of Interest

The authors declare that they have no conflicts of interest, competing financial interest or personal relationship that could have influenced the work reported in this paper.

Informed consent

Not applicable.

Ethical approval & declaration

In this article, the animal regulations are followed as per the ethical committee guidelines of Department of Fisheries Resources, High Institute of Marine Research, Latakia University, Syria; the authors observed the Distribution of Exotic Teleost Fish Species Arrived in Syrian Marine Water (Eastern Mediterranean) during the Period 2018-2025. The Animal ethical guidelines are followed in the study for species observation, & identification.

Data and materials availability

All data associated with this study are present in the paper.

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