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An annotated checklist of native freshwater lampreys and fishes of the Southern Caspian Sea Basin

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ABSTRACT

The present study provides an updated checklist of the native freshwater ichthyofauna of the southern Caspian Sea basin**.** The confirmed native and endemic fishes of this basin comprise 92 species in 46 genera, 21 families, 13 orders, and 2 classes. Among these, 11 species (11.9%) are endemic. Orders with the largest numbers of species in the ichthyofauna of Iran are the Cypriniformes (40 species), followed by Gobiiformes (24 species), Clupeiformes (8 species), Acipenseriformes (6 species), and Perciformes (4 species). At the family level, the Gobiidae has the greatest number of species (23 species; 25% of the total species), followed by the Leuciscidae (20 species), Clupeidae (8 species), Cyprinidae (7 species), Acipenseridae and Nemacheilidae (6 species in each), and Cobitidae and Oxudercidae (4 species in each).

Keywords: Ichthyofauna, Taxonomy, Caspian Sea basin, Freshwaters, Native, Endemic.

INTRODUCTION

Iran possesses a rich freshwater fish fauna in terms of diversity and endemism, and its ichthyofauna is characterized by having elements from the Palearctic, Oriental, and Ethiopian ecoregions with exotics from the Nearctic and Neotropical origins (Esmaeili *et al.* 2010a, b, 2013a, b, 2014a, b, 2017a, 2018). The remarkable Iranian ichthyofauna has long attracted the interest of foreign naturalists and scientists (Coad, 2019), and, later, awareness of Iranian fish taxonomy increased among Iranian researchers at the end of the 20th century. During the last two decades, scientists have significantly increased their knowledge of the Iranian freshwater fish diversity (Esmaeili *et al.* 2018).

The Caspian Sea, the world's largest enclosed inland water body, is recognized as one of the most distinctive aquatic ecosystems because of its complex geological history, high level of endemism, and remarkable diversity of freshwater, brackish, and marine organisms. The southern Caspian Sea basin, located primarily in northern Iran, comprises numerous river systems that originate in the Alborz Mountains and discharge into the Caspian Sea. These rivers support a rich freshwater ichthyofauna and provide essential habitats for many native, endemic,

Received:
Article type: Research

and migratory species. Owing to their geographical isolation, environmental heterogeneity, and historical connectivity with adjacent drainage systems, the rivers of the southern Caspian basin represent one of the most important centers of freshwater fish diversity in southwestern Asia.

The first checklist of Iranian freshwater fishes was published by Coad (1995), listing 150 species across 25 families, 14 orders, and 3 classes found in 19 drainage basins. Later, Coad (1998) listed 155 species in 67 genera, 24 families, 15 orders, and 3 classes. Subsequently, Esmaeili *et al.* (2010a) listed the freshwater fishes of Iran and confirmed 202 species in 104 genera, 28 families, 17 orders, and 3 classes. They also reported 23 species whose presence in Iranian waters needed confirmation by specimens. Later, Jouladeh-Roudbar *et al.* (2015a) listed 257 species in 106 genera, 29 families, 18 orders, and 3 classes. They reported Cypriniformes as the most diverse order, with 162 species (63.04% of the fauna), followed by Perciformes (32 species, 12.45%), Cyprinodontiformes (17 species, 6.61%), and Clupeiformes (11 species, 4.28%). Keivany *et al.* (2016) reported 163 species occurring in freshwater in Iran, excluding the Caspian Sea, based primarily on their own collections. In another publication, Esmaeili *et al.* (2017a) listed 288 species in 107 genera, 28 families, 22 orders, and 3 classes reported from different Iranian basins. However, they noted that the presence of 23 species in Iranian waters needs confirmation with specimens. Esmaeili *et al.* (2018) provided a new list of inland/freshwater fishes of Iran, reporting 297 species in 109 genera, 30 families, 24 orders, and 3 classes (including 23 unconfirmed species). Jouladeh-Roudbar *et al.* (2020) presented a list of 274 recognized species in 100 genera, 33 families, 20 orders, and 3 classes. In the last published checklist, Eagderi et al. (2022) listed 292 fish species across 3 classes, 24 orders, 36 families, and 106 genera in the inland waters of Iran.

Although numerous publications address freshwater fish taxonomy, datasets of freshwater fish assemblages remain limited. In this paper, we present a comprehensive account of the native freshwater lamprey and fish fauna of the southern Caspian Sea basin, based on previous checklists (Esmaeili *et al*. 2018; Eagderi *et al*. 2022), which include only confirmed species. This checklist is updated based on recent systematic and ichthyological studies. This provides a reliable reference for researchers, fisheries managers, conservation practitioners, and environmental agencies, improves understanding of freshwater biodiversity, and supports future conservation and management efforts.

MATERIAL AND METHODS

The species in the following list are compiled from two sources. We cross-checked the data and supplemented them with information from recent publications on native species inhabiting the southern part of the Caspian Sea basin. The previously published checklists are taken as a baseline (Esmaeili *et al.* 2018; Eagderi *et al.* 2022). We also evaluated fish distribution information in FishBase (Froese & Pauly 2025). We added additional fish records published over the last decade, and evaluated some questionable species that appeared in previous checklists, either verifying them or excluding them from the present list. We follow the family classification of Nelson *et al.* (2016) while incorporating the phylogenetic concept developed by Betancourt-R *et al.* (2017), with orders and families arranged systematically and genera and species arranged alphabetically within each family, though we updated scientific names based on Fricke et al. (2026). For sturgeon taxonomy (Acipenseridae), we adopted the phylogenetic concept of Vasil'eva *et al.* (2009) and therefore referred to *Huso huso* (Linnaeus, 1758) as *Acipenser huso.*

In this checklist, we include only those fishes that spend part of their lives, or their entire life history, in freshwater systems. Some species are excluded from the checklist because (1) they were erroneously identified, (2) taxa were synonymized, and (3) they were probably not occurring in inland waters of Iran and need confirmation by specimens. We exclude such questionable species from the list unless their occurrence is confirmed.

RESULTS

We revised and updated the current status of the native and endemic ichthyofauna of the southern Caspian Sea basin. A total of 92 fish species belonging to 2 classes, 13 orders, 21 families, and 46 genera inhabit the region. Among these, 11 species (11.9%) are endemic, and 80 species (88.1%) are native. Orders with the largest numbers of species in the ichthyofauna of Iran are the Cypriniformes (40 species), followed by Gobiiformes (24 species), Clupeiformes (8 species), Acipenseriformes (6 species), and Perciformes (4 species). At the family level, the Gobiidae has the greatest number of species (23 species; 25% of the total species), followed by the Leuciscidae

Caspian J. Environ. Sci.
DOI:

Received:
Article type: Research

(20 species), Clupeidae (8 species), Cyprinidae (7 species), Acipenseridae and Nemacheilidae (6 species in each), and Cobitidae and Oxurcidae (4 species in each).

Species name **(Author)** [Occurrence]—[IUCN], English Name/ Distribution (Reference/s).

Kingdom ANIMALIA
Phylum CHORDATA
Subphylum CRANIATA
Infraphylum VERTEBRATA
Superclass PETROMYZONTOMORPHI
Class PETROMYZONTIDA
Order PETROMYZONTIFORMES
Family PETROMYZONTIDAE
Genus *Caspiomyzon* Berg, 1906

1. ***Caspiomyzon wagneri*** (Kessler, 1870) [N]—[NT], Caspian lamprey/Caspian Sea Basin (Eagderi et al. 2017d; Namdarian Rad et al. 2017).

Superclass GNATHOSTOMATA
Grade TELEOSTOMI
Class OSTEICHTHYES
Subclass ACTINOPTERYGII
Infraclass CHONDROSTEI
Order ACIPENSERIFORMES
Family ACIPENSERIDAE
Genus *Acipenser* Linnaeus, 1758

2. ***Acipenser gueldenstaedtii*** Brandt & Ratzeburg, 1833 [N]—[CR], Russian sturgeon/Caspian Sea Basin (Esmaeili et al. 2018).
3. ***Acipenser huso*** Linnaeus, 1758 [N]—[CR], Beluga/Caspian Sea Basin (Asgari *et al.* 2014; Esmaeili *et al.* 2018 as *Huso huso*).
4. ***Acipenser nudiventris*** Lovetsky, 1828 [N]—[CR], Fringebarbel sturgeon/Caspian Sea Basin (Esmaeili *et al.* 2018).
5. ***Acipenser persicus*** Borodin, 1897 [N]—[CR], Persian sturgeon/Caspian Sea Basin (Eagderi *et al.* 2017a; Esmaeili et al. 2018).
6. ***Acipenser ruthenus*** Linnaeus, 1758 [N]—[VU], Sterlet/Caspian Sea Basin. Comment: Reported from the middle and South Caspian Sea by Naseka and Bogutskaya (2009) but not confirmed by specimens from Iran**.** This species is transported to the Shahid Rajaee Fish Aquaculture Center in Sari, Mazandaran, and to other fish farms in the provinces of Guilan and Golestan for aquaculture.
7. ***Acipenser stellatus*** Pallas, 1771 [N]—[CR], Stellate sturgeon/Caspian Sea Basin (Esmaeili *et al.* 2018).

NEOPTERYGII
Infraclass HOLOSTEI
Division TELEOSTEOMORPHA
Subdivision TELEOSTEI
Supercohort CLUPEOCEPHALA
Cohort OTOCEPHALA
Superorder CLUPEOMORPHA
Order CLUPEIFORMES
Family ALOSIDAE

Kottelat and Freyhof (2007) listed *Alosa volgensis* (Berg, 1913) from Iranian waters, but we cannot confirm its presence in Iran. This species is restricted to the northern Caspian Sea. *Alosa curensis* (Suvorov, 1907) is poorly known and has been described from Kyzylagach Bay in Azerbaijan. We could not confirm this species in Iran.

Received:
Article type: Research

Family EHIRAVIDAE

Genus *Alosa* Linck, 1790

8. ***Alosa braschnikowi*** (Borodin, 1904) [N]—[NE], Caspian marine shad, Brazhnikov's shad/ Caspian Sea Basin (Esmaeili et al. 2018; Saffari et al. 2021).
9. ***Alosa caspia*** (Eichwald, 1838) [N]—[LC], Caspian shad/Caspian Sea Basin (Esmaeili et al. 2018).
10. ***Alosa kessleri*** **(**Grimm, 1887) [N]—[LC], Caspian anadromous shad, blackback or black-spined herring /Caspian Sea Basin (Esmaeili et al. 2018).
11. ***Alosa saposchnikowii*** (Grimm, 1885) [N]—[NE], Saposhnikov's shad, big-eyed shad /Caspian Sea Basin (Esmaeili et al. 2018).
12. ***Alosa sphaerocephala*** (Berg, 1913) [N]—[LC], Agrakhan shad/Caspian Sea Basin (Esmaeili *et al.* 2018).

Genus *Clupeonella* Kessler, 1877

13. ***Clupeonella caspia*** Svetovidov, 1941 [N]—[LC], Caspian tyulka/Caspian Sea Basin (Esmaeili *et al.* 2018; Amiri et al. 2018).

Remark: *Clupeonella caspia* has long been considered a subspecies of *Clupeonella cultriventris* (Nordmann, 1840), widespread along the coasts of the Black Sea and entering the lower reaches of rivers. Hoestlandt (1991), followed by Kottelat and Freyhof (2007), separates these two tyulkas primarily by paired-fin length, a character that Kuljanishvili et al. (2020) found to overlap substantially in the materials examined. However, Kottelat and Freyhof (2007) and Bogutskaya *et al.* (2013) identify the Caspian tyulka as a separate species. While Kuljanishvili et al. (2020) consider it a junior synonym of *C. cultriventris.* More data using different populations from the southern Caspian Sea and the Black Sea are needed to accept this synonymy.

14. ***Clupeonella engrauliformis*** (Borodin, 1904) [N]—[NE], Caspian tyulka, anchovy sprat /Caspian Sea Basin (Esmaeili et al. 2018).
15. ***Clupeonella grimmi*** Kessler, 1877 [N]—[NE], Southern Caspian sprat, Bigeye kilka/Caspian Sea Basin (Esmaeili *et al.* 2018).

Superorder OSTARIOPHYSI

Series OTOPHYSI

Subseries CYPRINIPHYSI

Order CYPRINIFORMES

SUBORDER CYPRINOIDEI

Family ACHEILOGNATHIDAE

Genus *Rhodeus* Agassiz, 1832

16. ***Rhodeus caspius*** Esmaeili, Sayyadzadeh, Japoshvili, Eagderi, Abbasi & Mousavi-Sabet, 2020 [E]—[NE], Caspian bitterling/Southern Caspian Sea basin, introduced to the Urmia Lake and Tigris basins (Esmaeili *et al.* 2020a).

Family CYPRINIDAE

Genus *Barbus* Daudin, 1805

17. ***Barbus cyri*** De Filippi, 1865 [N]—[NE], Kura barbel/Caspian Sea basin (Jalili *et al*. 2017; Khaefi *et al.* 2017).

Genus *Capoeta* Valenciennes, 1842

18. ***Capoeta capoeta*** (Güldenstädt, 1773) [N]—[LC], Caucasian scraper/Caspian Sea basin (Esmaeili *et al.* 2017a; Zareian *et al.* 2018).
19. ***Capoeta razii*** Jouladeh-Roudbar, Eagderi, Ghanavi & Doadrio, 2017 [E]—[NE], Caspian scraper/Caspian Sea and Kavir basins (Jouladeh-Roudbar *et al.* 2017b).

Genus *Cyprinus* Linnaeus, 1758

20. ***Cyprinus carpio*** Linnaeus, 1758 [N]—[VU], Common carp/Native populations in the Caspian Sea basin; also introduced there and elsewhere in Iran (Esmaeili *et al.* 2017a, 2018; Jafari *et al.* 2025).

Caspian J. Environ. Sci.
DOI:

Received:
Article type: Research

Genus *Luciobarbus* Heckel, 1843

21. ***Luciobarbus brachycephalus*** (Kessler, 1872) [N]—[VU], Aral barbel/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).
22. ***Luciobarbus capito*** (Güldenstädt, 1773) [N]—[VU], Bulatmai barbel/Caspian Sea basin (Eagderi *et al.* 2013; Esmaeili et al. 2018).
23. ***Luciobarbus mursa*** (Güldenstädt, 1773) [N]—[LC], Mursa/Caspian Sea and Urmia Lake basins (Esmaeili *et al.* 2017a, 2018).

Family GOBIONIDAE

Genus *Romanogobio* Bănărescu, 1961

24. ***Romanogobio macropterus*** (Kamensky, 1901) [N]—[LC], South Caucasian gudgeon/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Family LEUCISCIDAE

Genus *Abramis* Cuvier, 1816

25. ***Abramis brama*** (Linnaeus, 1758) [N]—[LC], Common bream/The Caspian Sea basin and introduced to the Urmia Lake basin (Sahraeian *et al.* 2016).

Genus *Acanthobrama* Heckel, 1843

26. ***Acanthobrama microlepis*** (De Filippi, 1863) [N]—[LC], Blackbrow bleak/Caspian Sea basin (Esmaeili *et al.* 2018; Abbasi Ranjbar *et al.* 2018).

Genus *Alburnoides* Jeitteles, 1861

27. ***Alburnoides eichwaldii*** (De Filippi, 1863) [N]—[LC], South western Caspian spirlin, Eichward's riffle minnow/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).
28. ***Alburnoides holciki*** Coad & Bogutskaya, 2012 [N]-[NE], Hari spirlin, Holcik's riffle minnow/Hari and the Caspian Sea/Atrak River basins (Jouladeh-Roudbar *et al.* 2020).
29. ***Alburnoides samiii*** Mousavi-Sabet, Vatandoust & Doadrio, 2015 [E]—[NE], Sefidrud spirlin, Samii riffle minnow/Caspian Sea basin (Mousavi-Sabet *et al.* 2015a).
30. ***Alburnoides tabarestanensis*** Mousavi-Sabet, Anvarifar & Azizi, 2015 [E]—[NE], Tajan spirlin/Caspian Sea basin (Mousavi-Sabet *et al.* 2015b).

Genus *Alburnus* Rafinesque, 1820

31. ***Alburnus chalcoides*** (Güldenstadt, 1772) [N]—[LC], Caspian shemaya/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).
32. ***Alburnus filippii*** Kessler, 1877 [N]—[LC], Kura bleak/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).
33. ***Alburnus hohenackeri*** Kessler, 1877 [N]—[LC], Transcaucasian bleak/Native in the Caspian Sea basin and translocated to other basins in Iran (Zareian *et al.* 2013).

Genus *Ballerus* Heckel, 1843

34. ***Ballerus sapa*** (Pallas, 1814) [N]—[LC], White-eye bream/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Blicca* Heckel, 1843

35. ***Blicca bjoerkna*** (Linnaeus, 1758) [N]—[LC], Silver bream/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Chondrostoma* Agassiz, 1832

36. ***Chondrostoma cyri*** Kessler, 1877 [N]—[LC], Southern Caspian nase/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Caspian J. Environ. Sci.
DOI:

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Article type: Research

Genus *Leucaspius* Heckel & Kner, 1857

37. ***Leucaspius delineatus*** (Heckel, 1843) [N]—[LC], Moderlieschen/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Leuciscus* Cuvier, 1816

38. ***Leuciscus aspius*** (Linnaeus, 1758) [N]—[LC], Asp, European asp/Caspian Sea basin (Esmaeili *et al.* 2017, 2018; Abbasi *et al.* 2021a).

Genus *Pelecus* Agassiz, 1835

39. ***Pelecus cultratus*** (Linnaeus, 1758) [N]—[LC], Ziege/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Rutilus* Rafinesque, 1820

40. ***Rutilus kutum*** (Kamensky, 1901) [N]—[NE], Kutum/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018; Pourshabanan *et al.* 2023; Arkhi *et al.* 2026).

Remark: Kuljanishvili et al. (2020**)** suggest that *Rutilus kutum* is a junior synonym of *R. frisii* (Nordmann, 1840), citing their unpublished data. However, molecular studies (Kotlik *et al.* 2008; Levin *et al.* 2017; Pourshabanan *et al.* 2023) have confirmed that *Rutilus kutum* is a distinct species.

41. ***Rutilus caspicus*** (Yakovlev, 1870) [N]—[NE], Vobla/Southern Caspian Sea basin (Levin *et al.* 2025).

Remark: Recent molecular studies (Levin et al. 2025) indicate that southern Caspian populations represent a separate phylogenetic lineage among the nominal taxa of the genus *Rutilus*.

Genus *Scardinius* Bonaparte, 1837

42. ***Scardinius erythrophthalmus*** (Linnaeus, 1758) [N]—[LC], Rudd, redeye, redfin, pearl roach/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Squalius* Bonaparte, 1837

43. ***Squalius turcicus*** De Filippi, 1865 [N]—[LC], Transcaucasian chub/Urmia Lake and southern Caspian Sea basins (Mouludi-Saleh *et al.* 2020b).

Genus *Vimba* Fitzinger, 1873

44. ***Vimba persa*** (Pallas, 1814) [N]—[LC], Persian vimba, Caspian vimba/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Family TINCIDAE

Genus *Tinca* Cuvier, 1816

45. ***Tinca tinca*** (Linnaeus, 1758) [N]—[LC], Tench/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Superfamily COBITOIDEA

Family COBITIDAE

Genus *Cobitis* Linnaeus, 1758

46. ***Cobitis faridpaki*** Mousavi-Sabet, Vasil'eva, Vatandoust & Vasil'ev, 2011 [E]—[NE], Faridpak's spine loach or Siahrud spined loach/Caspian Sea basin (Mousavi-Sabet *et al.* 2011).

47. ***Cobitis saniae*** Eagderi, Jouladeh-Roudbar, Jalili, Sayyadzadeh & Esmaeili, 2017 [N]—[NE], Sania's spined loach/Caspian Sea basin (Eagderi *et al.* 2017c; Vasil'eva & Vasil'ev, 2020).

Genus *Sabanejewia* Vladykov, 1929

48. ***Sabanejewia aurata*** (De Filippi, 1863) [N]—[LC], Golden spined loach/Caspian Sea basin (Sayyadzadeh *et al.* 2018a; Çiçek et al. 2022).

49. ***Sabanejewia caspia*** (Eichwald, 1838) [N]—[NE], Caspian spined loach/Caspian Sea basin (Sayyadzadeh *et al.* 2018a; Vasil'eva & Vasil'ev, 2019; Vasil'eva *et al.* 2022).

Caspian J. Environ. Sci.
DOI:

Received:
Article type: Research

Family NEMACHEILIDAE

Genus *Oxynoemacheilus* Bănăraescu & Nalbant, 1966

50. ***Oxynoemacheilus bergi*** (Gratzianov, 1907) [N]—[LC], Berg's Loach/Caspian Sea basin (Mohammadi *et al.* 2018).

51. ***Oxynoemacheilus bergianus*** (Derjavin, 1934) [N]—[LC], Safid River stone loach/Caspian Sea, Urmia and Namak lake basins (Mouludi-Saleh and Eagderi, 2021a).

52. ***Oxynoemacheilus elsae*** Eagderi, Jalili & Çiçek, 2018 [N]—[LC], Elsa's loach/Caspian Sea and Urmia Lake basins (Eagderi *et al.* 2022).

Genus *Paracobitis* Bleeker, 1863

53. ***Paracobitis abrishamchiani*** Mousavi-Sabet, Vatandoust, Geiger & Freyhof, 2019 [E]—[NE], Abrishamchi crested loach/Caspian Sea basin (Mousavi-Sabet *et al.* 2019).

54. ***Paracobitis atrakensis*** Esmaeili, Mousavi-Sabet, Sayyadzadeh, Vatandoust & Freyhof, 2014 [E]—[NE], Atrak crested loach/Caspian Sea and Kavir basins (Esmaeili *et al.* 2014d).

55. ***Paracobitis hircanica*** Mousavi-Sabet, Sayyadzadeh, Esmaeili, Eagderi, Patimar & Freyhof, 2015 [E]—[NE], Eastern crested loach/Caspian Sea basin (Mousavi-Sabet *et al.* 2015d).

Subseries SILURIPHYSI

Order SILURIFORMES

Family SILURIDAE

Genus *Silurus* Linnaeus, 1758

56. ***Silurus glanis*** Linnaeus, 1758 [N]—[LC], Wels catfish/Caspian Sea and Urmia Lake basins (Esmaeili *et al.* 2017a, 2018).

Superorder PROTACANTHOPTERYGII

Order SALMONIFORMES

Family SALMONIDAE

Genus *Salmo* Linnaeus, 1758

57. ***Salmo caspius*** Kessler, 1877 [N]—[NE], Caspian trout/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Stenodus* Richardson, 1836

58. ***Stenodus leucichthys*** (Güldenstädt, 1772) [N]—[EW], Inconnu, Sheefish/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Order ESOCIFORMES

Family ESOCIDAE

Genus *Esox* Linnaeus, 1758

59. ***Esox lucius*** Linnaeus, 1758 [N]—[LC], Northern pike/Caspian Sea basin; introduced in some lakes and reservoirs of Iran (Esmaeili *et al.* 2017a, 2018).

Order GADIFORMES

Family LOTIDAE

Genus *Lota* Oken, 1817

60. ***Lota lota*** (Linnaeus, 1758) [N]-[LC], Burbot/ Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Series PERCOMORPHA

Subseries GOBIIDA

Order GOBIIFORMES

Family GOBIIDAE

Genus *Anatirostrum* Iljin, 1930

61. ***Anatirostrum profundorum*** (Berg, 1927) [N]—[NE], Duckbilled goby, Duckbilled pugolovka/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018; Vasil'eva *et al.* 2025a).

Caspian J. Environ. Sci.
DOI:

Received:
Article type: Research

Genus *Benthophilus* Eichwald, 1831

62. ***Benthophilus abdurahmanovi*** Ragimov, 1978 [N]—[NE], Abdurakhmanov's tadpole goby/Caspian Sea basin (Abbasi, 2017).

63. ***Benthophilus baeri*** Kessler, 1877 [N]—[NE], Baer's pugolovka/Caspian Sea basin (Abbasi, 2017).

64. ***Benthophilus ctenolepidus*** Kessler, 1877 [N]—[NE], Transparent tadpole goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

65. ***Benthophilus granulosus*** Kessler, 1877 [N]—[LC], Granular tadpole goby, Granular pugolovka/Caspian Sea basin (Abbasi, 2017, Sayyadzadeh & Esmaeili, 2024).

66. ***Benthophilus leobergius*** Berg, 1949 [N]—[LC], Caspian stellate tadpole goby/Caspian Sea basin (Abbasi, 2017; Zarei *et al.* 2021a).

67. ***Benthophilus macrocephalus*** (Pallas, 1787) [N]—[LC], Caspian tadpole goby, bighead tadpole goby/Caspian Sea basin (Abbasi, 2017).

68. ***Benthophilus persicus*** Kovacic, Smaeili, Zarei, Abbasi & Schleiwen 2021 [N]—[NE], Persian tadpole goby/Caspian Sea basin (Zarei et al., 2022, Sayyadzadeh & Esmaeili, 2024).

69. ***Benthophilus pinchuki*** Ragimov, 1982 [N]—[NE], Pinchuk's tadpole goby/Caspian Sea basin (Abbasi, 2017, Sayyadzadeh & Esmaeili, 2024).

Genus *Mesogobius* Bleeker, 1874

70. ***Mesogobius nonultimus*** (Iljin, 1936) [N]—[NE], Caspian toad goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Neogobius* Iljin, 1927

71. ***Neogobius bathybius*** (Kessler, 1877) [N]-[NE], Deepwater goby/Caspian Sea basin (Zarei *et al.* 2021a).

72. ***Neogobius caspius*** (Eichwald, 1831) [N]—[NE], Caspian goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018; Nikmehr *et al.* 2021).

73. ***Neogobius melanostomus*** (Pallas, 1814) [N]—[LC], Round goby, black spotted goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

74. ***Neogobius pallasi*** (Berg, 1916) [N]—[LC], Caspian sand goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018; Nikmehr *et al.* 2021).

Genus *Ponticola* Iljin, 1927

75. ***Ponticola cyrius*** (Kessler, 1874) [N]—[LC], Kura River goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

76. ***Ponticola goebelii*** (Kessler, 1874) [N]—[NE], Caspian ratan, ratan goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

77. ***Ponticola gorlap*** (Iljin, 1949) [N]—[LC], Caspian bighead goby/Caspian Sea basin (Esmaeili *et al.* 2017, 2018).

78. ***Ponticola hircaniaensis*** Zarei, Esmaeili, Kovačić, Schliewen & Abbasi, 2022 [E]-[NE], Hircaniaen bighead goby/Caspian Sea basin (Zarei *et al.* 2022).

79. ***Ponticola iranicus*** Vasil'eva, Mousavi-Sabet & Vasil'ev, 2015 [E]—[NE], Persian goby/Caspian Sea basin (Vasil'eva *et al.* 2015).

80. ***Ponticola patimari*** Eagderi, Nikmehr & Poorbagher, 2020 [E]—[NE], Patimar goby/Caspian Sea basin (Eagderi *et al.* 2020c).

81. ***Ponticola syrman*** (Nordmann, 1840) [N]—[LC], Syrman goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

Genus *Proterorhinus* Smitt, 1900

82. ***Proterorhinus blennioides*** (Kessler, 1877) [N]—[LC], Eastern tubenose goby/Caspian Sea basin (Zarei *et al.* 2021a – as *P. nasalis* (De Filippi, 1863); Vasil'eva *et al.* 2025a, b, c).

Caspian J. Environ. Sci.
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Family OXUDERCIDAE
Genus *Knipowitschia* Iljin, 1927
83. ***Knipowitschia bergi*** Iljin, 1928 [N]—[LC], Volga dwarf goby/Caspian Sea basin (Abbasi, 2017; Sayyadzadeh & Esmeili, 2024).
84. ***Knipowitschia caucasica*** (Berg, 1916) [N]—[LC], Caucasian dwarf goby/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).
85. ***Knipowitschia iljini*** Berg, 1931 [N]—[NE], Iljin's dwarf goby/Caspian Sea basin (Esmaeili *et al.* 2017, 2018).
86. ***Knipowitschia longecaudata*** **(**Kessler, 1877) [N]—[LC], Longtail dwarf goby/Caspian Sea basin (Abbasi, 2017).

Infraseries ATHERINOMORPHA
Order ATHERINIFORMES
Suborder ATHERINOIDEI
Family ATHERINIDAE
Subfamily ATHERININAE
Genus *Atherina* Linnaeus, 1758
87. ***Atherina caspia*** Eichwald, 1831 [N]—[NE], Caspian silverside/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018; Maramaei *et al.* 2026).

Order SYNGNATHIFORMES
Suborder SYNGNATHOIDEI
Superfamily SYNGNATHOIDEA
Family SYNGNATHIDAE
Genus *Syngnathus* Linnaeus, 1758
88. ***Syngnathus caspius*** Eichwald, 1831 [N]—[LC], Caspian pipefish/Caspian Sea basin (Zarei *et al.* 2021b).

Order PERCIFORMES
SUBORDER PERCOIDEI
SUPERFAMILY PERCOIDEA
Family PERCIDAE
Genus *Perca* Linnaeus, 1758
89. ***Perca fluviatilis*** Linnaeus, 1758 [N]—[LC], European perch/Caspian Sea basin (Abbasi *et al.* 2021b).

Genus *Sander* Oken, 1817
90. ***Sander lucioperca*** (Linnaeus, 1758) [N]—[LC], Pike perch/Caspian Sea basin; introduced to lakes and reservoirs throughout Iran (Esmaeili *et al.* 2017a, 2018).
91. ***Sander marinus*** (Cuvier, 1828) [N]—[DD], Estuarine perch/Caspian Sea basin (Esmaeili *et al.* 2017, 2018).

SUBORDER GASTEROSTEOIDEI
Family GASTEROSTEIDAE
Genus *Pungitius* Coste, 1848
92. ***Pungitius platygaster*** (Kessler, 1859) [N]—[LC], Southern nine-spine stickleback/Caspian Sea basin (Esmaeili *et al.* 2017a, 2018).

DISCUSSION

This checklist shows that the southern Caspian Sea basin supports one of the richest freshwater fish assemblages in Iran, with 92 native species representing 2 classes, 13 orders, 21 families, and 46 genera. Based on the current checklist, 11 species (11.9%) are endemic, and 83 species (88.1%) are native. Orders with the largest numbers of species in the ichthyofauna of Iran are the Cypriniformes (40 species), followed by Gobiiformes (24 species), Clupeiformes (8 species), Acipenseriformes (6 species), and Perciformes (4 species). At the family level, the Gobiidae has the greatest number of species (23 species; 25% of the total species), followed by the Leuciscidae

Received:
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(20 species), Clupeidae (8 species), Cyprinidae (7 species), Acipenseridae and Nemacheilidae (6 species in each), and Cobitidae and Oxudercidae (4 species in each).

This high taxonomic diversity reflects the basin's complex geological history, environmental heterogeneity, and its role as an important biogeographic transition zone between Europe and western Asia. The predominance of Cypriniformes is consistent with the general pattern observed throughout the Palearctic region and in other Iranian inland waters, where cypriniform fishes dominate freshwater assemblages due to their extensive adaptive radiation and ecological versatility. Likewise, the high representation of Gobiiformes, particularly the family Gobiidae, highlights the unique ecological connection between freshwater and the brackish environments of the Caspian Sea. The occurrence of 11 endemic species further emphasizes the basin's exceptional conservation value and its importance as a center of regional endemism (Eagderi *et al.* 2022; Esmaeili *et al.* 2023).

The dominance of the families Gobiidae and Leuciscidae, together accounting for nearly half of all recorded species, reflects the availability of diverse habitats ranging from large rivers and floodplains to estuarine and coastal environments. The relatively high diversity of Clupeidae and Acipenseridae also underscores the ecological importance of the southern Caspian basin for anadromous and migratory fishes, many of which depend on riverine habitats for spawning and recruitment (Mazandarani & Namroodi, 2025; Mansourghanaei *et al.* 2026). However, several endemic and migratory species are currently threatened by river fragmentation, dam construction, water abstraction, pollution, invasive species, overfishing, and climate-driven hydrological changes. Consequently, this updated checklist provides an essential baseline for biodiversity monitoring, conservation prioritization, and fisheries management. Continued taxonomic investigations, integrative molecular studies, and long-term monitoring programs are needed to clarify the status of cryptic taxa, document temporal changes in species distributions, and support effective conservation strategies for the unique freshwater ichthyofauna of the southern Caspian Sea basin (Heidari et al. 2023).

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