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Original Article

Ichthyofauna of the Iranian part of the Sirvan River drainage with the first record of *Cobitis avicenna* and *Oxynoemacheilus euphraticus*

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Abstract: This study investigated the fish diversity of the Sirvan River drainage, Tigris River basin. Sampling was performed at 20 stations during 2020-2021 using an electrofishing device. A total of 32 species in 23 genera, 12 families and seven orders, including *Barbus lecerta, Capoeta damascina*, *C. trutta*, *C. umbla, Carassius gibelio*, *Cyprinion macrostomum, C. kais, Garra rufa*, *Luciobarbus barbulus, Cyprinus carpio* (Cyprinidae), *Ctenopharyngodon idella*, *Hypophthalmichthys molitrix*, *H. nobilis*, *Hemiculter leucisculus* (Xenocyprididae), *Cobitis avicennae* (Cobitidae), *Oxynoemacheilus euphraticus, O. zarzianus, O. kurdistanicus, O. parvinae*, *Turcinoemacheilus kosswigi*, *Paracobitis molavi* (Neomacheilidae), *Squalius berak*, *S. lepidus*, *Alburnus sellal*, *A. hohenackeri* (Leuciscidae), *Pseudorasbora parva* (Gobionidae), *Rhinogobius lindbergi* (Gobiidae), *Esox lucius* (Esocidae), *Mastacembelus mastacembelus* (Mastacembelidae), *Glyptothorax pallens* (Sisoridae), *Oncorhynchus mykiss* (Salmonidae) and *Gambosia holbrooki* (Poeciliidae) were recorded. *Carassius gibelio*, *C. idella*, *C. carpio*, *H. molitrix* and *H. nobilis*, *A. hohenackeri P. parva*, *H. leucisculus*, *O. mykiss, R. lindbergi, E. lucius* and *G. holbrooki* were exotic species introduced to this river system. This study confirms the new records of *O. euphraticus* and *C. avicennae* for the first time from the Iranian part of the Sirvan River drainage.

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Introduction

Iran has a high diversity of freshwater fishes (Esmaeili et al., 2018) distributed in 19 exorheic and endorheic basins. In recent years, many new species, and records were described and reported from remote areas of Iran that had been investigated rarely (Eagderi et al., 2019a; Eagderi & Mousavi-Sabet, 2021; Mousavi-Sabet et al., 2021; Esmaeili et al., 2022). Sirvan River drainage with an area of 7500 km^2 located in the mountainous region of the Kurdistan Province with a length of 213 km and a maximum flow of 250m^3/s (Jafari, 2000). Due to the importance of this river system and the lack of a comprehensive study on its fish inventory, the current study was conducted to investigate the ichthyofauna of the Iranian part of the Sirvan River drainage with two new records from this drainage.

Materials and Methods

During 2020-2021, some 985 specimens from 20 stations were sampled in the Sirvan River drainage (Fig. 1). Sampling was performed using an electrofishing device. Then, using identification keys Keivany et al. (2016), and Esmaeili et al. (2018), the fishes were identified. Some of the fishes were fixed into 10% fixed formalin after anesthesia and the rest were released to the river.

Results

The collected samples represented 32 species in 23 genera, 12 families, and seven orders. Dominant order was Cypriniformes (26 species; 81%), followed by Gobiiformes, Esociformes, Synbranchiformes, Siluriformes, Salmoniformes and Cyprinodontiformes each having 1 species (Figs. 2, 3).

Checklist

Species name **(Author)—**[IUCN], English Name/Figure.
* = endemic, ** = exotic.

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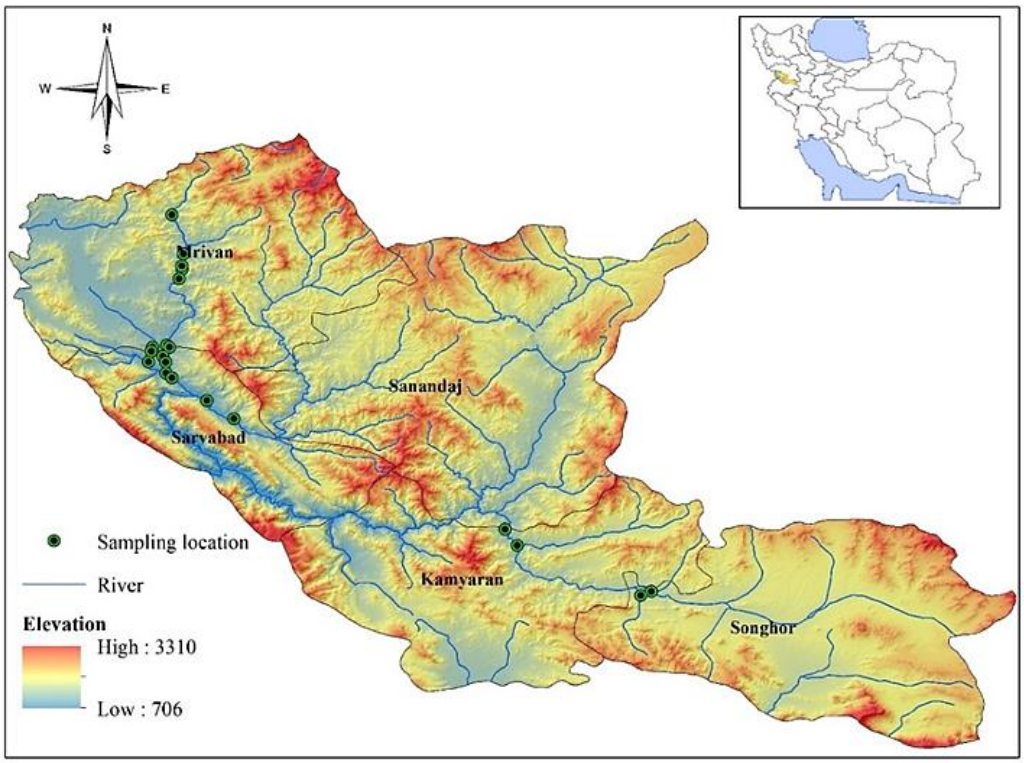


Figure 1. Sampling stations of the Sirvan River.

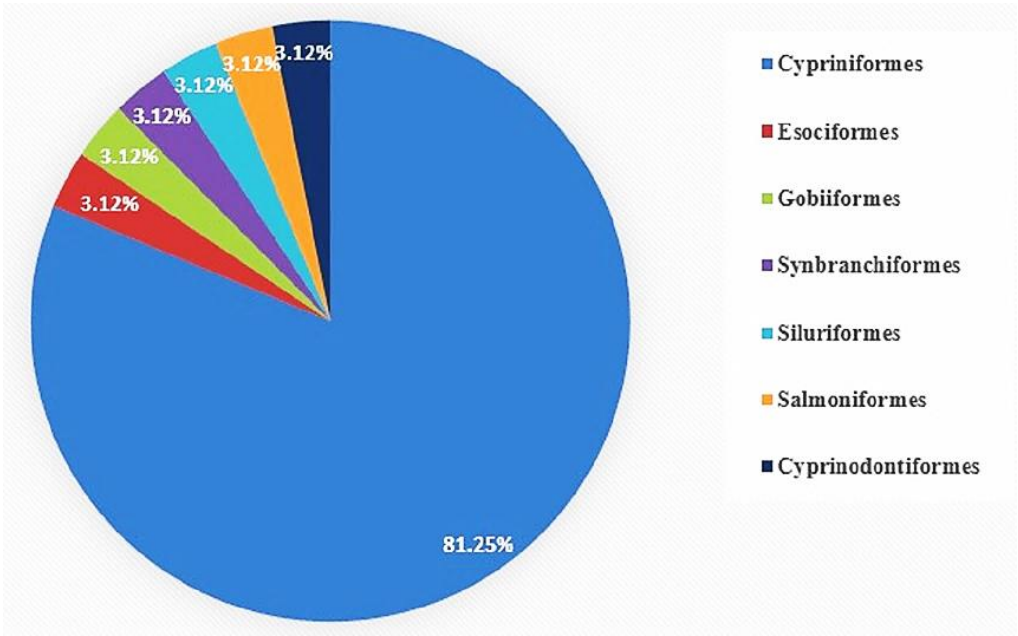


Figure 2. Percent of fish species in different fish orders.

Class Actinopterygii
Order Cypriniformes (6 families, 17 genera, and 26 species)
Family Cyprinidae (7 genera and 10 species)
Genus *Barbus* Cuvier, 1816

1- *Barbus lecerta* Heckel, 1843—[Least Concern (LC)], Kura barbell (Fig. 4a)
Genus *Capoeta* Valenciennes, 1842
2- *Capoeta damascina* (Valenciennes, 1842)—[Least Concern (LC)], Mesopotamian barb (Fig. 4b)

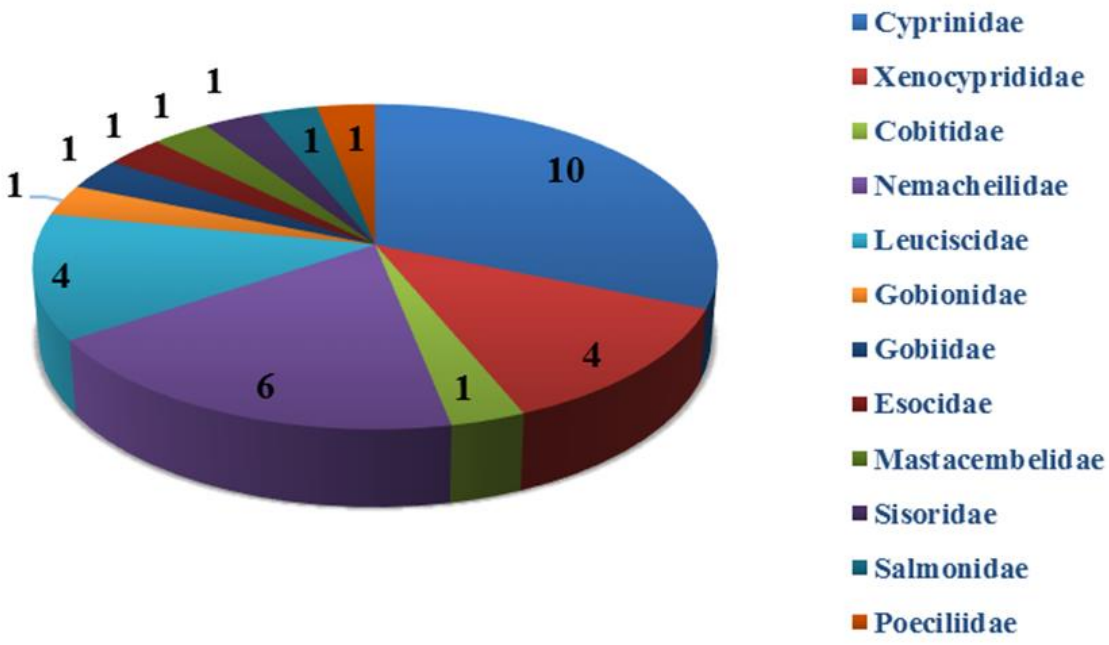


Figure 3. Number of fish species in different families.

Remark: This species is found as sympatric with *C. umbla* in Sirvan River drainage.

3- *Capoeta trutta* (Heckel, 1843)—[Least Concern (LC)], Longspine scraper (Fig. 4c)

4- *Capoeta umbla* (Heckel, 1843)—[Least Concern (LC)], Tigris scraper (Fig. 4d)

Remark: It was reported from Iran by Esmaeili et al. (2016). It differs from *C. damascina* in its morphological (Esmaeili et al., 2016) and osteological (Jawad and Alwan, 2020; Çiçek et al., 2021) characteristics.

Genus *Carassius* Jarocki, 1822

5- *Carassius gibelio* (Bloch, 1782)**—[Potential pest], Prussian carp (Fig. 4e)

Genus *Cyprinion* Heckel, 1843

6- *Cyprinion macrostomum* Heckel, 1843—[Least Concern (LC)], Tigris kingfish (Fig. 4f)

7- *Cyprinion kais* Heckel, 1843—[Least Concern (LC)], Kais kingfish (Fig. 4g)

Remark: Both *C. macrostomum* and *C. kais* are inhabited sympatrically in the Sirvan River drainage.

Genus *Garra* Hamilton, 1822

8- *Garra rufa* (Heckel, 1843)—[Least Concern (LC)], Red Garra (Fig. 4h)

Genus *Luciobarbus* Heckel, 1843

9- *Luciobarbus barbulus* (Heckel, 1849)—[Not Evaluated], Qarah Aqaj barbell (Fig. 4i)

Genus *Cyprinus* Linnaeus, 1758 (1 species)

10- *Cyprinus carpio* Linnaeus, 1758**—[Least Concern (LC)], Common carp

Family Xenocyprididae (3 genera and 4 Species)

Genus *Ctenopharyngodon* Steindachner, 1866 (1 species)

11- *Ctenopharyngodon idella* (Valenciennes, 1844)**—[Not Evaluated], Grass carp

Genus *Hypophthalmichthys* Bleeker, 1859 (2 species)

12- *Hypophthalmichthys molitrix* (Valenciennes, 1844)** —[Least Concern (LC)], Silver carp

13- *Hypophthalmichthys nobilis* (Richardson, 1844) **—[Least Concern (LC)], Bighead carp

Genus *Hemiculter* Bleeker, 1859 (1 species)

14- *Hemiculter leucisculus* (Basilewsky, 1855)**—[Least Concern (LC)], Sharpbelly (Fig. 4j)

Family Cobitidae (1 genus, 1 species)

Genus *Cobitis* Linnaeus, 1758 (1 species)

15- *Cobitis avicennae* Mousavi-Sabet, Vatandoust, Esmaeili, Geiger & Freyhof, 2015*—[Not Evaluated],

Zagros spined loach (Fig. 4k)
Remark: *Cobitis avicennae* has been described from the Karkheh River drainage in the Tigris River basin (Mousavi-Sabet et al., 2015). This species is reported from the Sirvan River for the first time.

Family Nemacheilidae (2 genera and 6 species)
Genus *Oxynoemacheilus* Bănăraescu & Nalbant, 1967 (3 species)
16- *Oxynoemacheilus euphraticus* (Bănărescu & Nalbant, 1964)—[Least Concern (LC)] (Fig. 4l)
Remark: It was already reported from Karoun river drainage as *O. freyhofi* and later treated as a junior synonym of *O. euphraticus* (Freyhof (2016). It is a widely distributed species in the Sirvan River drainage.
17- *Oxynoemacheilus zarzianus* Freyhof & Geiger, 2017—[Least Concern (LC)] (Fig. 4m)
Its record has been confirmed in Garan (Marivan) and Sirvan rivers by Eagderi et al. (2022).
18- *Oxynoemacheilus kurdistanicus* Kamangar, Prokofiev, Ghaderi & Nalbant, 2014—[Not Evaluated], Kurdistan stone loach (Fig. 4n)
Remark: This species was described by Kamangar et al. (2014), from Lesser Zab, which is reported from the Sirvan River drainage in the current study.
19- *Oxynoemacheilus parvinae* Sayyadzadeh, Eagderi & Esmaeili, 2016*—[Not Evaluated], Parvin stone loach (Fig. 4o)
Genus *Turcinoemacheilus* Bănărescu & Nalbant, 1964 (1 species)
20- *Turcinoemacheilus kosswigi* Bănărescu and Nalbant, 1964—[Least Concern (LC)], Kosswig's loach (Fig. 4p)
Remark: Its molecular identification was confirmed by Nikmehr et al. (2020) from Gaveh River.
Genus *Paracobitis* Bleeker, 1863 (1 species)
21- *Paracobitis molavii* Freyhof, Esmaeili, Sayyadzadeh & Geiger, 2014*—[Not Evaluated], Molavi's crested loach (Fig. 4q)

Family Leuciscidae (2 genera and 4 species)
Genus *Squalius* Bonaparte, 1837 (2 species)
22- *Squalius berak* Heckel, 1843—[Least Concern (LC)], Mesopotamian chub (Fig. 4r)
23- *Squalius lepidus* Heckel, 1843—[Least Concern (LC)], Mesopotamian pike chub (Fig. 4s)

Genus *Alburnus* Rafinesque, 1820 (2 species)
24- *Alburnus sellal* Heckel, 1843—[Least Concern (LC)], Sellal bleak (Fig. 4t)
25- *Alburnus hohenackeri* Kessler, 1877**—[Least Concern (LC)], North Caucasian bleak (Fig. 4u)

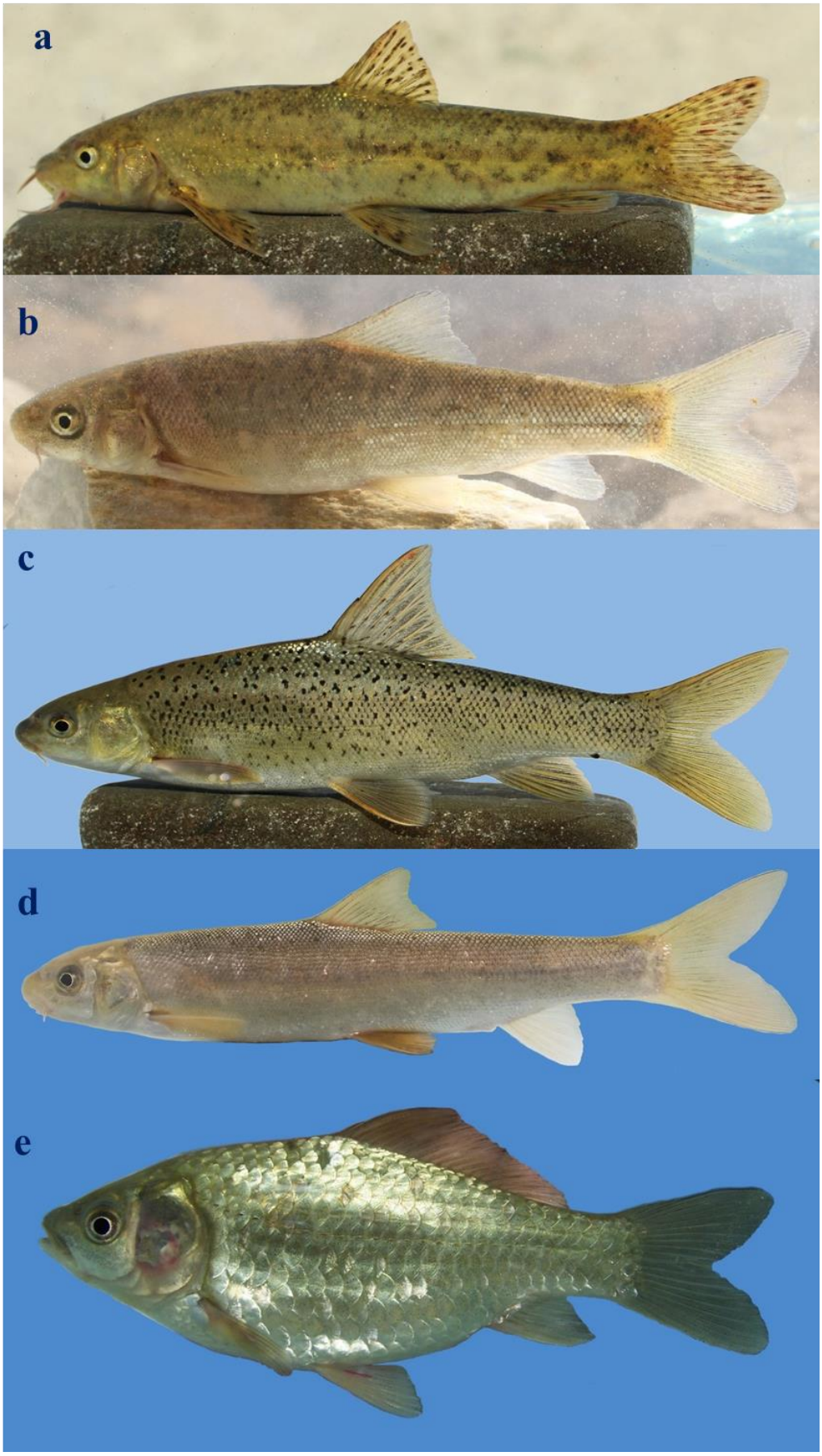
Family Gobionidae (1 genus and 1 species)
Genus *Pseudorasbora* Bleeker, 1859 (1 species)
26- *Pseudorasbora parva* (Temminck & Schlegel, 1846)**—[Least Concern (LC)], Stone moroko (Fig. 4v)

Order Gobiiformes (1 family, 1 genus and 1 species)
Family Gobiidae (1 genus and 1 species)
Genus *Rhinogobius* Gill, 1859 (1 species)
27- *Rhinogobius lindbergi* Berg, 1933**—[Not Evaluated], Amur goby (Fig. 4w)
Remark: This species was first recorded by Eagderi et al. (2018) and we collect it only in the Gaveh River.

Order Esociformes (1 family, 1 genus and 1species)
Family Esocidae (1 genus and 1species)
Genus *Esox* Linnaeus, 1758 (1species)
28- *Esox lucius* Linnaeus, 1758**—[Least Concern (LC)], Northern pike (Fig. 4x)

Order Synbranchiformes (1 family, 1 genus and 1 species)
Family Mastacembelidae (1 genus and 1 species)
Genus *Mastacembelus* Scopoli, 1777 (1 species)
29- *Mastacembelus mastacembelus* (Banks & Solander, 1794)—[Least Concern (LC)], Euphrates spiny eel (Fig. 4y)

Order Siluriformes (1 family, 1 genus and 1 species)
Family Sisoridae (1 genus and 1 species)
Genus *Glyptothorax* Blyth, 1860 (1 species)
30- *Glyptothorax pallens* (Mousavi-Sabet, Eagderi, Vatandoust & Freyhof, 2021)*—[Not Evaluated], Pallens catfish (Fig. 4z)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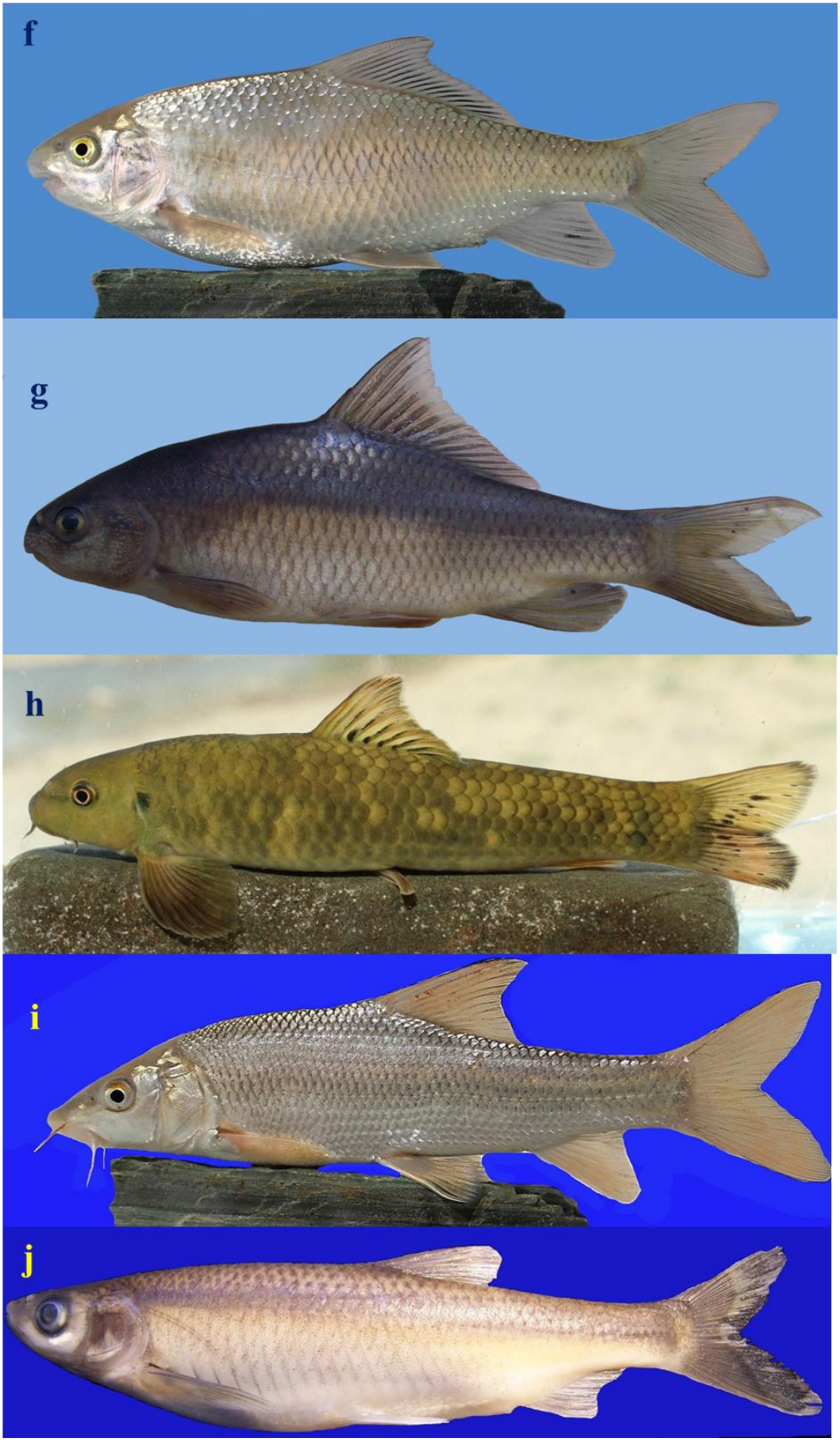
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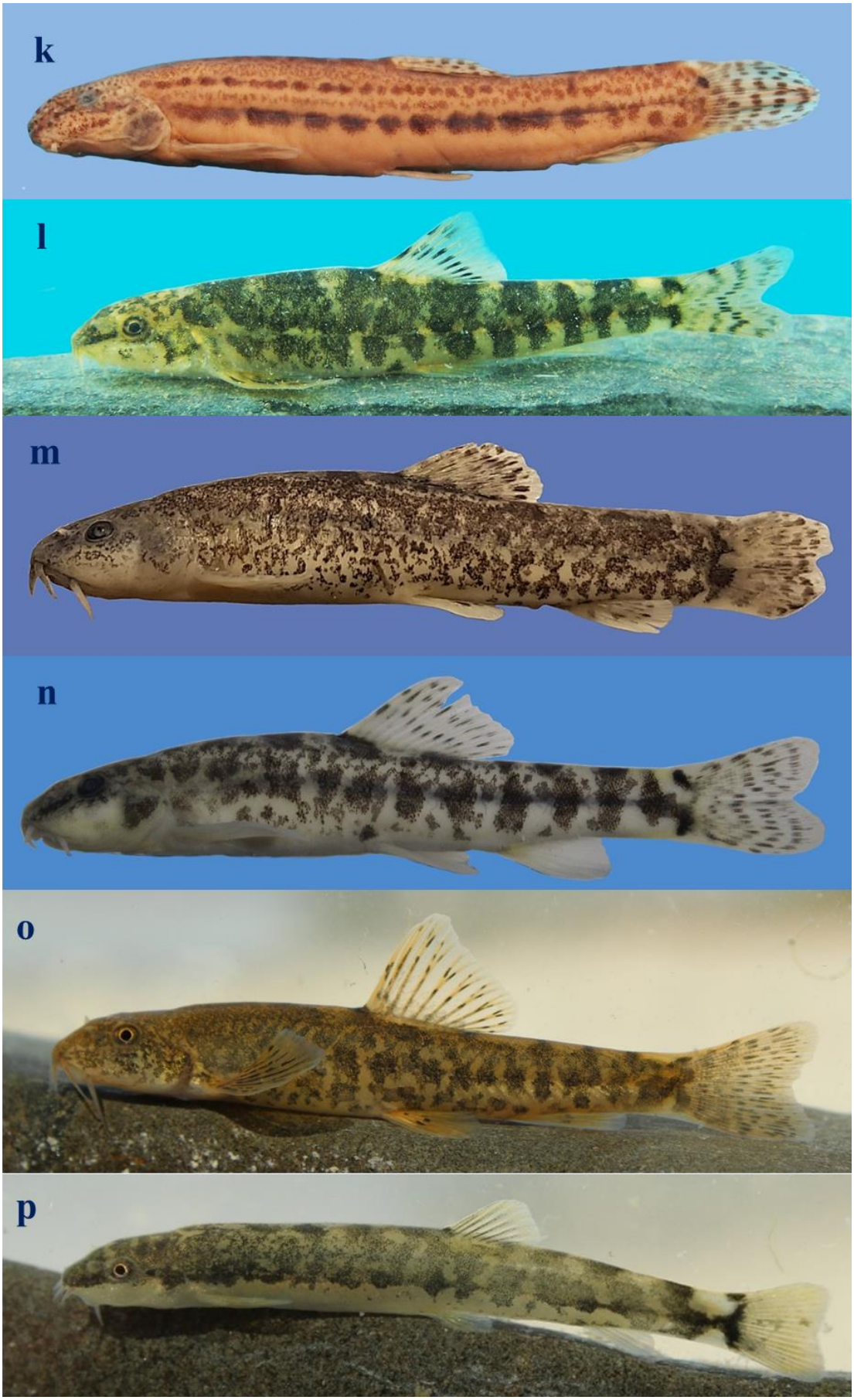
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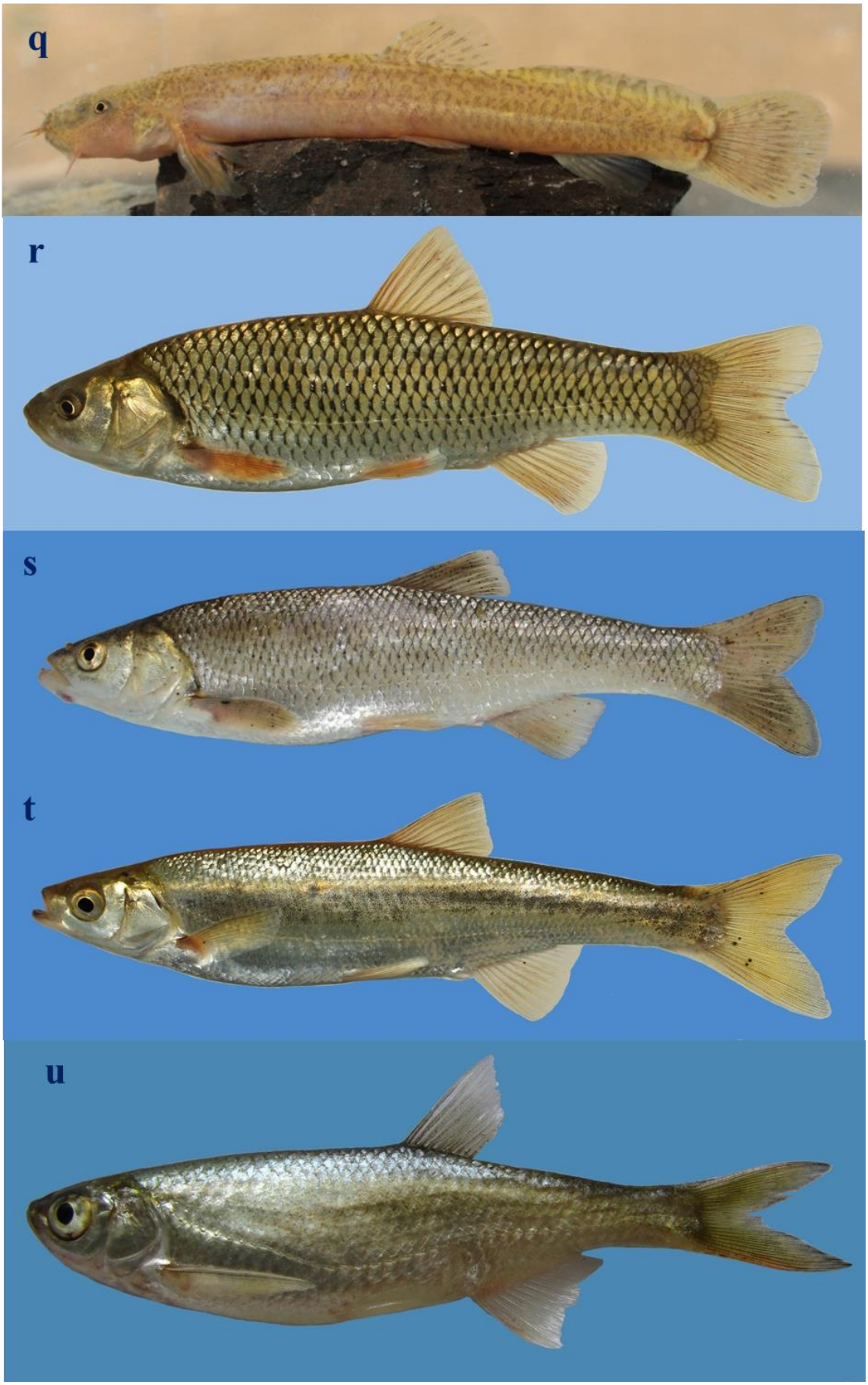
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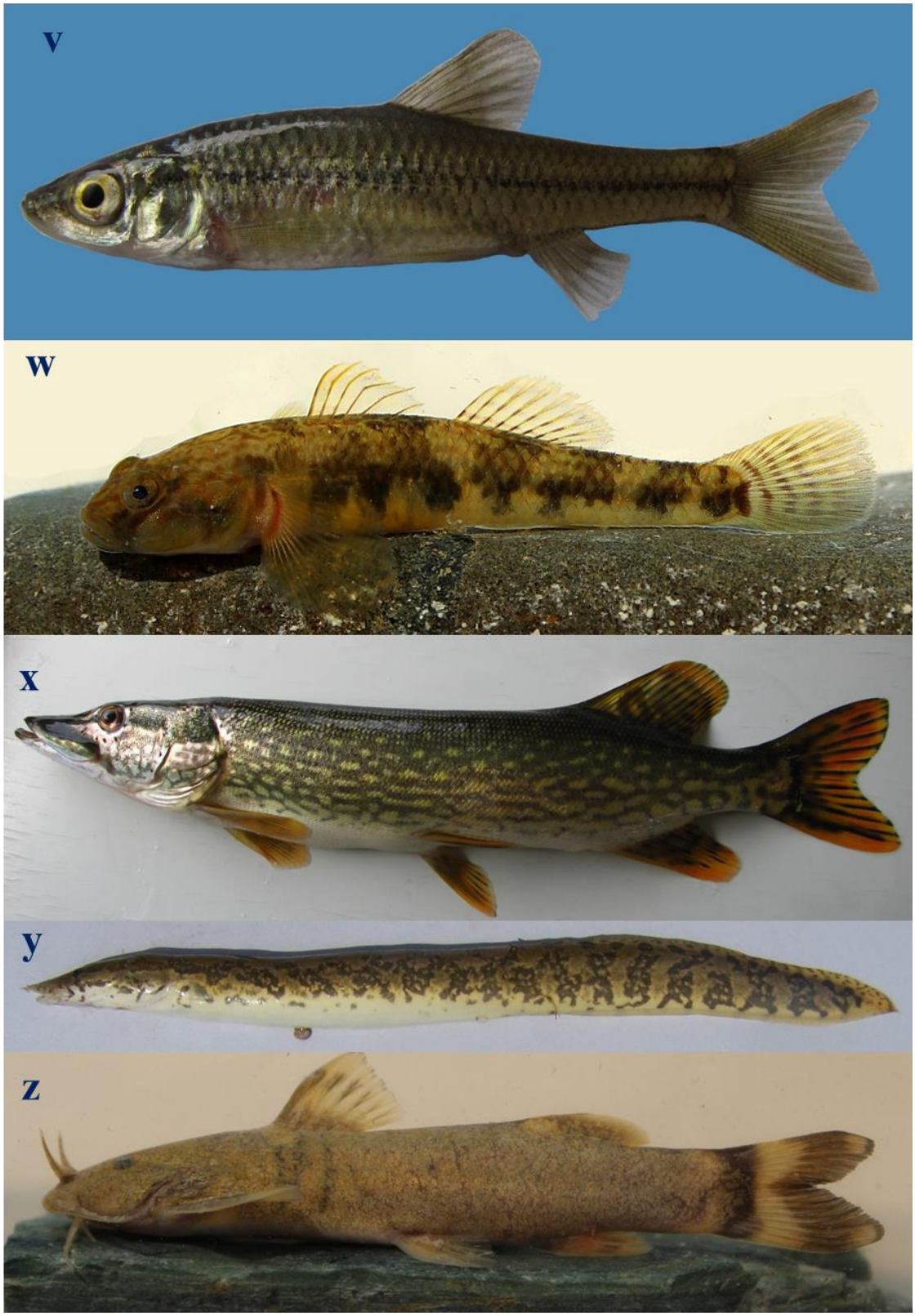

Figure 3. Fish's pictures of the Sirvan River drainage (a) *Barbus lecerta*, (b) *Capoeta damascina*, (c) *C. trutta*, (d) *C. umbla*, (e) *Carassius gibelio*, (f) *Cyprinion macrostomum*, (G) *C. kais*, (h) *Garra rufa*, (i) *Luciobarbus barbulus*, (j) *Hemiculter leucisculus*, (k) *Cobitis avicennae*, (l) *Oxynoemacheilus euphraticus*, (m) *O. zarzianus*, (n) *O. kurdistanicus*, (o) *O.parvinae*, (p) *Turcinoemacheilus kosswigi*, (q) *Paracobitis molavii*, (r) *Squalius berak*, (s) *S. lepidus*, (t) *Alburnus sellal*, (u) *A. hohenackeri*, (v) *Pseudorasbora parva*, (4) *Rhinogobius lindbergi*, (x) *Esox lucius*, (y) *Mastacembelus mastacembelus* and (z) *Glyptothorax pallens*.

Order Salmoniformes (1 family, 1 genus and 1 species)
Family Salmonidae (1 genus and 1 species)
Genus *Oncorhynchus* Suckley, 1861(1 species)
31- *Oncorhynchus mykiss* (Walbaum, 1792) ****—**[Not Evaluated], Rainbow trout

Order Cyprinodontiformes (1 family, 1 genus and 1 species)
Family Poeciliidae (1 genus and 1 species)
Genus *Gambusia* Poey, 185 (1 species)
32- *Gambusia holbrooki* Girard, 1859****—**[Least Concern (LC)], Eastern mosquitofish

Discussions

Iran occupies a significant part of the Middle East, and its freshwater fish fauna shows a high level of species richness and endemism (Esmaeili et al., 2018). The Sirvan River drainage is part of the Persian Gulf basin, having elements of Ethiopian, Oriental and Palearctic ichthyofauna. The isolation of fishes in the mountainous region of Kurdistan Province has led to promoting speciation e.g. *P. molavii*, *O. parvinae* and *G. pallens*. In addition, we can expect new species in this river drainage as described past year (Freyhof et al., 2014; Sayyadzadeh et al., 2016; Mousavi-Sabet et al., 2021).

There were some studies regarding ichthyofauna of the Sirvan River, but partially such as Esmaeili et al. (2011) about ichthyofauna of Zarivar Lake (Iran) with the first records of *H. leucisculus* and *A. hohenackeri*, and reporting 12 other species i.e. *B. lacerta*, *C. barroisi*, *C. damascina*, *C. gibelio*, *C. idella*, *C. carpio*, *H. molitrix*, *H. nobilis*, *P. parva*, *S. lepidus*, *M. mastacembelus* and *G. holbrooki*. However, *C. barroisi* is not found in Iran (Zareian et al., 2018) and is probably misidentified by *C. trutta*. Rezaee and Rafiee (2014) by sampling 8 stations in the Oramanat region and Paveh city, identified three families of Cyprinidae, Sisoridae and Balitoridae. In this list, genus *Capoeta* with two species of *C. damascina* and *C. trutta*; *B. barbulus* (*Barbus*); *Leuciscus cephalus* (*Leuciscus*) and *G. rufa*. *Leuciscus cephalus* (as *S. berak* or *S. lepidus*) and *B. barbulus* (as *Luciobarbus barbulus*) have erroneously been identified. Alizadeh-Marzani et al. (2015) reported 12 species from the Gaveh River, and Hasankhani et al. (2019), in their study on the abundance and biodiversity of Sirvan River have listed 17 fish species. However, these two works had focused on the limited area of this river drainage. There are some awkward reports regarding some fish species viz. *Rhinogobius cf. similis*, *Oxynoemacheilus angorae, Squalius cephalus, Alburnus mossulensis, Capoeta barroisi*, *Barbus barbulus*, *Leuciscus cephalus* that probably are erroneously identified (Esmaeili et al., 2011; Rezaee and Rafiee, 2014; Hasankhani et al., 2019).

Anthropological activities have led to many invasive fishes, including *C. gibelio, C. idella, C. carpio, H. molitrix, H. nobilis, A. hohenackeri*, *P. parva, H. leucisculus, O. mykiss* and *G. holbrooki* in this drainage. These fishes are commercially valuable exotic species introduced to natural aquatic ecosystems of Kurdistan Province by fish farms or ornamental and aquarium fishes. The results revealed 12 exotic species had been introduced to the Sirvan River drainage. Based on our field observations, *C. gibeli, A. hohenackeri*, *P. parva, H. leucisculus, R. lindbergi* and *G. holbrooki* have been established and should be considered invasive. *Cyprinus carpio*, *C. idella, H. molitrix, H. nobilis* and *O. mykiss* have entered this river due to stocking fishes in the dam lakes and releasing them from fish farms and seem not to be established yet. *Alburnus hohenackeri* is a native species to western water bodies of the Sothern Caspian Sea basin (Esmaeili et al., 2018) and probably has been released to Zrebar Lake with other economic species and could be established. Following increasing the abundance of *C. gibeli* and *P. parva* in the Zrebar Lake, *E. lucius* was probably introduced to control these exotics. Introducing *E. lucius* to this lake led to crucial concerns regarding native fishes. In addition, this species could enter the main canal of Sirvan River, which was now found in the lower part of the Sirvan River drainage.

It seems that the expansion and threats of exotic species are constantly increasing. Although not all

exotic species are endangered, their progress is irresponsible, and the predictive effect of exotic species is complex and there is a little proper method to evaluate their effects. Therefore, to protect native fish in sensitive ecosystems such as the Sirvan River, avoiding any development that could lead to the release of invasive species is recommended.

Our intensive work conducted whole Iranian part of this river showed higher diversity than before. In addition, during the last decade, the taxonomic status of many Iranian freshwater fishes (Esmaeili et al., 2018) has been revised and some of their names have been changed. Therefore, updating the fish checklist of the Sirvan River drainage seems to be crucial. In addition, two new species are recorded from this river, viz. *C. avicenna* and *O. euphraticus*. The first record of the *C. avicennae* in the Sirvan River shows a range expansion of this species toward the more western part of Iran. *Cobitis avicennae* was described from the Karkheh River drainage, Persian Gulf basin (Mosavi-Sabet et al., 2015). The presence of this species shows its probable presence in other parts of the Tigris River drainage.

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References

Alizadeh A., Shojaei Kavan L., Taghoyan H., Shahriari R. (2017). A survey of biodiversity, abundance and distribution of the fish in Gaverood of Kermanshah Province. Breeding and Aquaculture Sciences, 3(8): 69-84.

Alwan N. (2011). Systematics, taxonomy, phylogeny and zoogeography of the *Capoeta damascina* species complex (Pisces: Teleostei: Cyprinidae) inferred from comparative morphology and molecular markers. PhD thesis, Frankfurt A.M., Germany: Goethe Universität.

Bănărescu P.M. (1999). The Freshwater Fishes of Europe, 5. Cyprinidae 2. Part I: *Rhodeus* to *Capoeta*. AULA-Verlag, Wiebelsheim.

Berg L.S. (1949). Freshwater fishes of Iran and adjacent countries. Trudy Zoologichesko-go Instituta Akademii Nauk, SSSR 8: 783-858. (In Russian)

Berra T.M. (2001). Freshwater fish distribution. Academic Press, San Diego. 604 p.

Bogutskaya N.G., Naseka A.M., Tikhonov P.A. (2008). A brief history of the study of fishes of the Caspian Sea and scientific results of the Caspian Expedition of 1904 headed by N.M. Knipovich. Aqua, Intenational Journal of Ichthyology, 14(1): 1-26.

Çiçek E., Eagderi S., Seçer B., Sungur S. (2021). *Capoeta kosswigi* Karaman, 1969 a junior synonym of *Capoeta damascina* (Valenciennes, 1842) (Teleostei: Cyprinidae). Turkish Journal of Zoology 45(3): 235-240.

Coad B.W. (1961). Fishes of the Tigris-Euphrates basin: a critical checklist. Syllogeus, 68: 1-49.

Coad B.W. (1995). Freshwater Fishes of Iran. Acta Scientiarum Naturalium Academiae Scientiarum Bohemicae, Brno, 29(1): 1-64.

Dyldin Yu V., Orlov A.M. (2016). Ichthyofauna of fresh and brackish waters of Sakhalin Island: an annotated list with taxonomic comments: 2. Cyprinidae--Salmonidae families. Journal of Ichthyology, 56(5): 656-693.

Eagderi S., Moulodi-Saleh A., Ghaderi E., Freyhof J. (2020). First record *Oxynoemacheilus zarzianus* Freyhof & Geiger, 2017 in Iranian inland waters. Iranian Journal of Ichthyology, 9(1): 11-15.

Eagderi S., Mousavi-Sabet H. (2021). *Capoeta raghazensis*, a new species of algae-scraping cyprinid from the Raghaz Canyon in Hormuz basin, southern Iran (Teleostei: Cyprinidae). Fishtaxa, 22: 37-44.

Eagderi S., Nasri M., Çiçek E. (2018). First record of the Amur goby *Rhinogobius lindbergi* Berg 1933 (Gobiidae) from the Tigris River drainage, Iran. International Journal of Aquatic Biology, 6(4): 202-207.

Eagderi S., Nikmehr N., Çiçek E., Esmaeili H.R., Vatandoust S., Mousavi-Sabet H. (2019a). *Barbus urmianus* a new species from Urmia Lake basin, Iran (Teleostei: Cyprinidae). International Journal of Aquatic Biology, 7(4): 239-244.

Eagderi S., Nikmehr N., Freyhof J. (2016b). *Alburnus zagrosensis*, a junior synonym of *Alburnus sellal* (Teleostei: Leuciscidae). Zootaxa, 4652(2): 4652.

Esmaeili H., Sayadzadeh G., Eagderi S., Abbasi K. (2018). Checklist of freshwater fishes of Iran, Fishtaxa, 3: 1-95.

Esmaeili H.R., Coad B.W., Gholamifard A., Nazari N., Teimory A. (2010). Annotated checklist of the freshwater fishes of Iran. Zoosystematica Rossica, 19: 361-386.

Esmaeili H.R., Sayyadzadeh G., Zarei F., Eagderi S., Mousavi-Sabet H. (2022). *Mystus cyrusi*, a new species of bagrid catfish (Teleostei: Bagridae) from Middle East. Zootaxa, 5099(3): 325-343.

Esmaeili H.R., Zareian H., Eagderi S., Alwan N. (2016). Review on the taxonomy of Tigris scraper, *Capoeta Umbla* (Heckel, 1843) and its confirmation record from the Iranian part of Tigris River, Persian Gulf Basin (Teleostei: Cyprinidae). Fishtaxa, 1: 35-44.

Esmaeili H.R., Gholamifard A., Freyhof J. (2011). Ichthyofauna of Zarivar Lake (Iran) with the first records of *Hemiculter leucisculus* and *Alburnus hohenackeri* in the Tigris drainage. Electronic Journal of Ichthyology, 7(1): 1-6.

Freyhof J. (2016). *Oxynoemacheilus karunensis*, a new species from the Persian Gulf basin (Teleostei: Nemacheilidae). Zootaxa, 4175(1): 94-100.

Freyhof J., Esmaeili H.R., Sayyadzadeh G., Geiger M. (2014). Review of the crested loaches of the genus *Paracobitis* from Iran and Iraq with the description of four new species (Teleostei: Nemacheilidae). Ichthyological Exploration of Freshwaters, 25(1): 11-38.

Hasankhani M., Keivany Y., Jabaleh A., Pouladi M., Mahboobi Soofiani N. (2019). A study on abundance and biodiversity of fishes in Sirvan River in Kurdistan. Journal of Applied Ichthyological Research, 6(3): 35-50.

Jafari A (2000). *Iran Geography*. Vol. 2 (Rivers). Iran Gitashesi Publishing Company. Tehran. 331 p.

Jawad LA, Alwan N, Osteological characters to define six species of the *Capoeta damascina* species complex (Cypriniformes: Cyprinidae). Journal of Ichthyology, 60: 182-203.

Kalous L., Bohlen J., Rylková K., Petrtýl M. (2012). Hidden diversity within the Prussian carp and designation of a neotype for *Carassius gibelio* (Teleostei: Cyprinidae). Ichthyological Exploration of Freshwaters, 1: 11-18.

Kamangar B.B., Prokofiev A.M., Ghaderi E., Nalbant T.T. (2014). Stone loaches of Choman River system, Kurdistan, Iran (Teleostei: Cypriniformes: Nemacheilidae). Zootaxa, 3755(1): 33-61.

Keivany Y., Nasri M., Abbasi K., Abdoli A. (2016). Atlas of Inland Water Fishes of Iran. Iran Department of Environment Press. 218 p.

Kottelat M., Freyhof J. (2007). Handbook of European Freshwater Fishes. Kottelat, Cornol, Switzerland and Freyhof. Berlin. Germany. 646 p.

Mousavi-Sabet H., Eagderi S., Vatandoust S., Freyhof J. (2021). Five new species of the sisorid catfish genus *Glyptothorax* from Iran (Teleostei: Sisoridae). Zootaxa, 5067(4): 451-484.

Mousavi-Sabet H., Vatandoust S., Esmaeili H.R., Geiger M.F., Freyhof J. (2015). *Cobitis avicennae*, a new species of spined loach from the Tigris River drainage (Teleostei: Cobitidae). Zootaxa, 3914(5): 558-568.

Nikmehr N., Eagderi S., Poorbagher H., Farahmand H. (2020). Taxonomic status of the *Turcinoemacheilus* populations (Nemachilidae) of the Gaveh River using the COI gene. Wetland Ecobiology, 12(2): 49-58.

Rezaee S., Rafiee G.H. (2014). Investigating the fishes of Sirvan River and their biology (Case study: Oreman-region Paveh city restrict). 2nd National Conference on Fisheries and Aquatic animals. Islamic Azad University of Bandar Abbas.02-26.

Romanov V.I., Interesova E.A., Dyldin Y.V., Babkina I.B., Karmanova O.G., Vorobiev D.S. (2017). An annotated list and current state of ichthyofauna of the Middle Ob River basin. International Journal of Environmental Studies, 74(5): 818-830.

Sayyadzadeh G., Eagderi S., Esmaeili H.R. (2016). A new loach of the genus *Oxynoemacheilus* from the Tigris River drainage and its phylogenetic relationships among the nemacheilid fishes (Teleostei: Nemacheilidae) in the Middle East based on mtDNA COI. Iranian Journal of Ichthyology, 3(4): 236-250

Semenchenko V., Son M.O., Novitski R., Kvach Y., Panov V.E. (2016). Checklist of non-native benthic macroinvertebrates and fish in the Dnieper River basin. BioInvasive Records 5(3): 185-187.

Zareian H., Esmaeili H.R., Gholamhosseini A., Alwan N., Coad B.W. (2018). Comments on the Mond Scraper, *Capoeta mandica* (Teleostei: Cyprinidae): Re-description, molecular systematics and distribution modeling. Journal of Ichthyology, 58(3): 283-295.