

**The First Report of Non-Indigenous Catfish, *Bagarius bagarius* (Family: Sisoridae) in the Inland Waters of Northeastern Iraq****Kuzeydoğu Irak'ın İç Sularında Yerli Olmayan Yayın Balığı *Bagarius bagarius*'un (Familiya: Sisoridae) İlk Tespiti**Laith A. Jawad<sup>1,\*</sup>, Ahmed M. Al-Dirawi<sup>2</sup>, Salim Serkan Güçlü<sup>3</sup>, Omer F. Al-Sheikhly<sup>4</sup><sup>1</sup>School of Environmental and Animal Sciences, Unitec Institute of Technology, 139 Carrington Road, Mt Albert, Auckland 1025-NEW ZEALAND<sup>2</sup>Basra Directorate of Environment, Iraqi Ministry of Environment, Basrah-IRAQ<sup>3</sup>Faculty of Eğirdir Fisheries, Isparta University of Applied Sciences, Isparta-TÜRKİYE<sup>4</sup>Department of Biology, College of Science, University of Baghdad, Baghdad-IRAQ\*Corresponding Author: [laith\\_jawad@hotmail.com](mailto:laith_jawad@hotmail.com)

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**How to Cite:** Jawad, L. A., Al-Dirawi, A. M., Güçlü, S. S. & Al-Sheikhly, O. (2025). The first report of non-indigenous Catfish, *Bagarius bagarius* (Family: Sisoridae) in the inland waters of Northeastern Iraq. *Acta Aquatica Turcica*, 21(3), 179-187. <https://doi.org/10.22392/actaquatr.1630857>**Abstract:** A single specimen of *Bagarius bagarius* (Hamilton, 1822), a freshwater catfish native to the Indian subcontinent, has been documented for the first time in the inland waters of Iraq. The individual was caught by angling from the Sirwan River (Diyala Province, northeastern Iraq; 34°20'46.22"N, 45°10'23.82"E) on 3 July 2024 and, and measured 370 mm in total length. This discovery represents the first confirmation of this non-native species in Iraqi freshwater ecosystems and highlights the increasing role of the global aquarium trade in facilitating aquatic species invasions. The unintended introduction of *B. bagarius* into this ecosystem is likely attributable to ornamental fish trade, which has been implicated in translocation of more than 1,000 freshwater species in more than 125 countries. Such trade practices pose significant challenges for natural resource managers to identify and mitigate potential invasive species due to the extreme diversity of taxa traded.**Keywords**

- Sirwan River
- Catfish
- Biodiversity
- New occurrence
- Aquarium trade

**Özet:** Hint yarımadasına özgü bir tatlı su yayın balığı olan *Bagarius bagarius*' un (Hamilton, 1822) tek bir örneği Irak'ın iç sularında ilk kez belgelenmiştir. Birey, 3 Temmuz 2024 tarihinde Sirwan Nehri'nden (Diyala Eyaleti, kuzeydoğu Irak; 34°20'46.22"N, 45°10'23.82"E) olta balıkçılığı ile yakalanmış ve toplam uzunluğu 370 mm olarak ölçülmüştür. Bu keşif, yerli olmayan bu türün Irak tatlı su ekosistemlerindeki ilk teyidini temsil etmekte ve küresel akvaryum ticaretinin sucül tür istilalarını kolaylaştırmadaki artan rolünü vurgulamaktadır. *B. bagarius*' un bu ekosisteme istem dışı girişinin, 125'ten fazla ülkede 1000'den fazla tatlı su türünün yer değiştirmesinde rol oynayan, süs balığı ticareti yoluyla ilişkilendirilmesi muhtemeldir. Bu tür ticaret uygulamaları, ticareti yapılan taksonların aşırı çeşitliliği nedeniyle, potansiyel istilacı türlerin belirlenmesi ve azaltılması hususunda, doğal kaynak yöneticileri için önemli zorluklar teşkil etmektedir.**Anahtar kelimeler**

- Sirwan Nehri
- Yayın Balığı
- Biyoçeşitlilik
- Yeni vaka
- Akvaryum ticareti

**1. INTRODUCTION**

*Bagarius bagarius* (Hamilton 1822), also known as the goonch catfish, is a freshwater species that sometimes enters brackish water (Riede, 2004). *B. bagarius* (goonch) is primarily native to the Indian subcontinent (e.g., Ganges-

Brahmaputra-Meghna river systems in India, Bangladesh, Nepal, and Bhutan) (Baensch & Riehl, 1985). However, there are reports of its presence in other Asian regions, though these are often debated due to taxonomic confusion with other *Bagarius* species (e.g., *B. yarrelli*, *B.*



*suchus*). From outside the Indian subcontinent, this species is reported from Southeast Asia. It is recorded from the Mekong River Basin in Cambodia (Rainboth, 1996; Kottelat, 2001), Laos (Kottelat, 2001), and Myanmar (Burma) (Talwar & Jhingran, 1991; Roberts, 1993). It is also reported from Indonesia at Sumatra (Kottelat et al., 1993) and Malaysia (Ng & Tan, 1999).

The maximum total length reported for this species is 2300 mm (Shrestha, 1994). Roberts (1983) suggested that the individuals of this species reach maturity at 80.5-192 mm for males and 80-185 mm for females. It is known as “Baghair” or “Bagh mach” in Bangladesh. In Bangla, the term “Bagh” refers to a tiger.

The freshwater catfish, *B. bagarius*, is imperative in Pakistan, Nepal, Bangladesh, Bhutan and India both as food and game fish, and there has been no exception to genetic deterioration for this species. This species plays an important role in the top-down management of the riverine food chain (Rabbani et al., 2023). This species is considered as Near Threatened (NT) in the IUCN (International Union for Conservation of Nature) Red Lists (Saha et al., 2021).

The business in freshwater ornamental fishes runs throughout more than 125 countries, includes well over 1000 discrete, widely obtainable species, and is conquered by species instigated from freshwater habitats (Evers et al., 2019). The great number of fish species in trade forms challenges in recognizing possibly invasive species, which is of specific worry to natural resource administrators. In reaction to the trade variety, invasion science research has focused on recognizing the features of species, habitats, and vectors that increase invasion success (Chan et al., 2019; Lawson & Hill, 2022). Generally, vital forecasters of infiltration achievement comprise bringing about pressure (Lockwood et al., 2009), preceding incursion history (Moyle & Marchetti 2006), and climatic resemblance (Bomford et al., 2010), which are knowledgeable by species features such as maximum body size and thermal tolerance (Schofield & Kline, 2018; Lawson & Hill, 2022).

Characteristics such as maximum body size can lead to pet neglect when a species grows too large for the tank dimensions (Holmberg et al., 2015). Pet desertion is a chief transmitter for incidents of ornamental fish outside of production areas, but is usually problematic to perceive (Magalhães et al., 2021). Large

maximum body size should disturb procreate pressure because numerous hobbyists will lack the care needs of these species. Additionally, because catfish species may be let go at larger body sizes, existence and ecological influences may be augmented following discharge (Liang et al., 2020). Moreover, to sufficiently prevail over the propagation and survival pressure following release, climatic factors must also be appropriate to establish them effectively (Tuckett et al., 2023).

The only exotic fish introductions that might established via aquarium trade reported from the freshwater system in Iraq are those of *Pangasianodon hypophthalmus* (Sauvage 1878) (see Khamees et al., 2013), *Mollienesia latipinna* (Lesueur 1821) (see Al-Faisal & Mutlak, 2015), and *Atractosteus spatula* (Mutlak et al., 2017), and oscar, *Astronotus ocellatus* (Jawad et al., 2022). In the freshwater system of Iraq, three cichlid species were documented, *Oreochromis aureus* (Steindacher, 1864) (Mutlak & Al-Faisal, 2009) *Oreochromis niloticus* (Linnaeus 1758) (Al-Faisal & Mutlak, 2015), and *Coptodon zillii* (Gervais 1848) (Al-Sa'adi, 2007).

In the current report, we document the presence of another ornamental aquarium species, *B. bagarius* in the open waters of the Sirwan River, Diyala Province, northeastern Iraq. This arrival proposes the occurrence of a possibly harmful species in the inland waters of Iraq.

## 2. MATERIALS AND METHODS

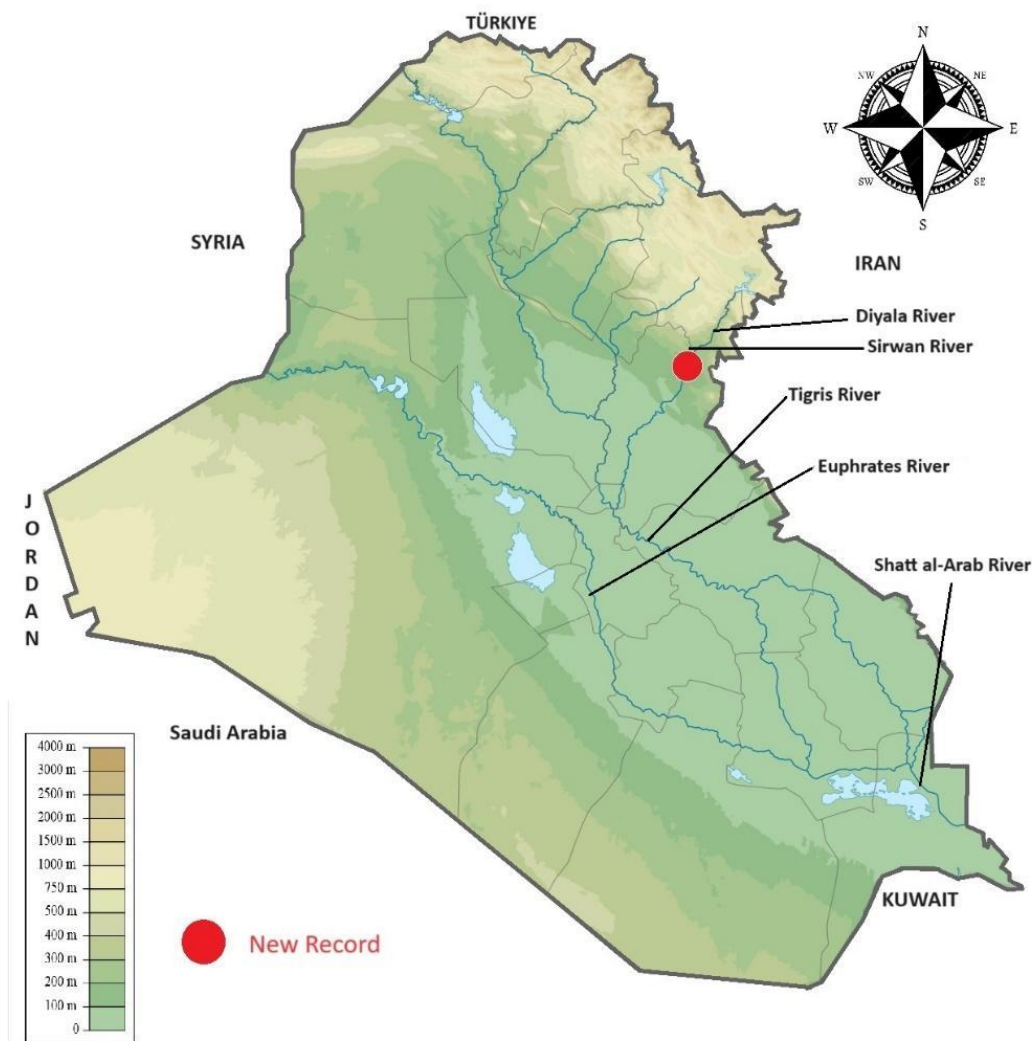
A single specimen of *B. bagarius* (Figures 1a, b), a species native to the Indian subcontinent, was caught from Sirwan River, near Al-Islah Village (ca. 7 km north of Jalawla township, north of Diyala Province, northeastern Iraq (34°20'46.22"N, 45°10'23.82"E) (Figure 2). The fish specimen was attained by a fisherman working in the area described above on 3<sup>rd</sup> July 2024. The specimen was identified according to Talwar and Jhingran (1991). While the specimen was with the fisherman, it was inspected, measured, and photographed, but it was not kept. The nomenclature was done as described by Eschmeyer et al. (2024). A series of morphometric measurements were made using a ruler in 1 mm increments (Table 1). The morphometric measurements were recorded as follows: Total length (TL), from the tip of the snout to the posterior tip of the caudal fin; Standard length (SL), from the tip of the snout to the posterior end of the hypural bones (caudal fin

base); Head length (HL), from the tip of the snout to the posterior margin of the operculum; Eye diameter (ED), horizontal measurement across the eye; Interorbital distance (IOD), horizontal distance between the dorsal margins of the eyes; Predorsal fin length (PredL), from the snout tip to the anterior origin of the dorsal fin; Prepectoral fin length (PrepL), from the snout tip to the anterior origin of the pectoral fin; Prepelvic fin length (PrepelvL), from the snout tip to the

anterior origin of the pelvic fin; Preanal fin length (PreanalL), from the snout tip to the anterior origin of the anal fin; Preadipose fin length (PreadL), from the snout tip to the anterior origin of the adipose fin; Caudal peduncle length (CPL), from the posterior end of the anal fin base to the caudal fin base; Caudal peduncle depth (CPD), minimum vertical depth of the caudal peduncle; Body depth (BD), maximum vertical depth of the body, measured at the deepest point.



**Figure 1.** Specimen of *B. bagarius* from the Sirwan River, north of Diyala Province, northeastern Iraq. A, directly after catch; B, Later after the hook and line were removed.



**Figure 2.** Map showing the collecting locality of *B. bagarius* from the Sirwan River, north of Diyala Province, northeastern of Iraq.

### 3. RESULTS

The specimen of *B. bagarius* measured as 370 mm in total length and showed the following characteristics: the body is dorsally convex and gradually tapering towards the tail. The ventral side is compressed with light yellow in colour. The mouth is equipped with an adhesive labial organ with which the fish cling to the rocks. There are four pairs of barbels around the mouth, with the premaxillary barbels being the largest. Eyes are small located near the posterior end of the head. The spiracles are wide and deep. Pectoral fins base anterior to the ventral-posterior

edge of the operculum. The anterior base of the dorsal fin is located slightly anterior to the base of pelvic fin. The anterior end of the adipose fin is positioned anterior to the base of the anal fin. The body colour is olive deep brown with dark blotches. Body skin is thickened with unculiferous tubercles. Fins are well developed and have a light yellowish grey colour. All fins have black spots.

The morphometric measurements were made using a ruler in 1 mm increments, following the methods of Talwar and Jhingran (1991) and shown in Table 1.

**Table 1.** Morphometric measurements (mm) of *B. bagarius* collected from the Sirwan River, northeastern Iraq.

Characters	Present study	Roberts, 1983	Paul et al., 2019
Total length (TL)	370	-	161 — 210
Standard length (% in TL)	328 (88.6%)	40.8 — 192	-
Head length (% in SL)	230 (70.1%)	-	-
Eye diameter (% in HL)	20.5 (8.9%)	21.3 — 24.2	-
Interorbital distance (% in HL)	73.8 (32.1%)	9.0 — 12.0	-
Predorsal fin length (% in SL)	139.3 (42.5%)	-	-
Prepectoral fin length (% in SL)	123 (37%)	-	-
Prepelvic fin length (% in SL)	164 (50%)	-	-
Preanal fin length (% in SL)	254.2 (77.5%)	-	-
Preadipose fin length (% in SL)	234 (71.3%)	-	-
Caudal peduncle length (% in SL)	36.9 (11.2%)	4.3 — 5.5	-
Caudal peduncle width (% in SL)	33 (10.1%)	19.4 — 24.7	-
Body depth at the dorsal fin (% in SL)	86.1 (26.3%)	5.6 — 7.2	-

#### 4. DISCUSSION

The maximum total length of *B. bagarius* can reach 2300 mm (Shrestha, 1994). The total length of the specimen described here is 370 mm, which is well below the total length reported. Our specimen (328 mm SL) is larger than that of Roberts (1983) (40.8—192 mm SL) and Paul et al. (2019) (161—210 mm SL).

In his taxonomic revision of the South and Southeast Asian sisorid catfish genus *Bagarius*, Roberts (1983) noted that *B. bagarius* and *B. yarrelli* are morphologically similar externally, but distinguishable by the position of the adipose fin. Roberts (1983) provided a photographic reference of *B. bagarius* in his work, and emphasized the considerable intraspecific variation in color patterns of this species. Similarly, Dutta and Sheik (2017) and Ng and Kottelat (2021) provided photographs of *B. bagarius*. The three photos provided by Roberts (1983), Dutta and Sheik (2017) and Ng and Kottelat (2021) differ from each other. Consequently, the observed colour differences between the Iraqi specimen and the specimen described by Roberts (1983) may reflect this natural variability.

In *B. bagarius*, the adipose fin commences far back over the anal fin, on a vertical through the base of the third or fourth anal-fin ray, while in *B. yarrelli* it begins near or in front of a vertical line through the anal fin origin. He also suggested that both *B. yarrelli* and *B. bagarius* showed a wide colour variation making the distinction of these two species very difficult.

The goonch, *B. bagarius* can be harmful if it becomes a successful invasive species, and it can make a maintainable population. The goonch is a

carnivorous fish; it feeds on small fishes, prawns, frogs, insects (Rahman, 1989; 2005). Therefore, *B. bagarius* is also important as a predator in top-down control of riverine food web. As most of the population of Iraq does not consume catfish species, the impact on this species will be minimal. Additionally, this fish could damage fishing nets due to the presence of sharp pectoral fin spines.

There are no published records of established populations of *B. bagarius* outside its native range in the Indian subcontinent. Furthermore, the species has not been reported in Iranian freshwater systems (Jouladeh-Roudbar et al., 2015; Esmaeili et al., 2018; Esmaeili, 2021; Eagderi et al., 2022; Çiçek et al., 2024) or Turkish freshwater systems (Çiçek et al., 2024). Consequently, the hypothesis that *B. bagarius* specimens reached Iraqi freshwaters via Iran or Türkiye lacks empirical support and cannot be accepted.

It is difficult to tell precisely how the specimen of *B. bagarius* was introduced and how it penetrated the Sirwan River, north of Diyala Province, northeastern Iraq, but it is known that these fish are considered among the ornamental fish and can be obtained from the ornamental fish shops, especially from the countries in the Indian subcontinent (Bidisha & Angsuman, 2014; Sinha & Jamal, 2015; Paul et al., 2019).

Recently, the aquarium trade in Iraq has become very popular with the easing of regulations for importing fishes into Iraq and an increase of aquarium shops (personal observation). The goonch is sold in these shops, mainly in large cities like Baghdad and Basrah. Catfish species are usually sold in the Aquaria shop for the purpose of cleaning the tank. Aquarists regularly get rid of the large-sized



catfish due to the size limit in the aquaria shop. Therefore, they liberate the catfish fish specimens into the open water bodies. It is also possible that the specimen of the goonch was released, because it reached a large size in a short period of time and became too large to keep in the aquarium. The current finding signifies the introduction of the fifth Iraqi case of the exotic species blamed on aquarium trade.

A recent survey of ornamental fish shops across major Iraqi cities (e.g., Baghdad, Basrah, Erbil) revealed that over 60% of traded species are non-native, originating primarily from Southeast Asia, South America, and the Indian subcontinent. Commonly sold species include *Pangasianodon hypophthalmus* (Asian shark catfish), *B. bagarius* (goonch), and *O. niloticus* (Nile tilapia), alongside popular aquarium staples like *Carassius auratus* (goldfish) and *Poecilia reticulata* (guppies). Approximately 45% of shop owners reported limited awareness of the species' invasive potential, with many customers releasing oversized or unwanted fish into local waterways. Import records further indicate lax regulatory oversight, with 30% of shops sourcing stock from unverified suppliers, exacerbating the risk of accidental introductions (Jawad et al., 2022).

In the case of the settlement of *B. bagarius* in the freshwater system of Iraq, the dealings of this species with local species require to be investigated chiefly with those that necessitate comparable ecological settings. Throughout the management strategies in progress in the Euphrates-Tigris Rivers in Iraq, a distinct consideration should be adopted to report any invasive species and present a management policy to eradicate them from the habitat.

The observation of *B. bagarius* in Iraq should lead to adopting strong actions to control the importation of species in the aquarium trade, which is accountable for the admission to new habitats for many fish, plant and invertebrate species worldwide (Rixon et al., 2005). Recently, the aquarium trade in Iraq fascinates numerous people, and, therefore, many native Indian subcontinent fish species are imported to big cities such as Baghdad and Basrah. The release of possibly harmful species, e.g., the goonch, in the many rivers and streams of Iraq will have an influence on the biodiversity.

Examples of the ecological disruption caused by catfish have been reported for many species of

this group. The introduction of invasive catfish species, such as the walking catfish (*Clarias batrachus*), has profoundly disrupted aquatic food webs in non-native habitats. As opportunistic benthic predators, these catfish consume a wide range of prey, including native fish eggs, larvae, crustaceans, and benthic invertebrates, leading to trophic cascades and declines in native biodiversity. For example, in Florida, *C. batrachus* has reduced populations of native sunfish (Centrarchidae) and crayfish (*Procambarus* spp.) through direct predation, altering energy flow and competitive dynamics (Courtenay & Stauffer, 1990; Mendoza et al., 2022). Their ability to survive in hypoxic conditions and traverse terrestrial habitats further exacerbates their spread, enabling colonization of isolated water bodies and intensifying pressure on vulnerable ecosystems.

Beyond predation, invasive catfish modify habitats by destabilizing sediments during foraging, which increases turbidity and reduces light penetration, thereby suppressing primary producers like phytoplankton and submerged macrophytes (Simberloff et al., 2013). This degradation of water quality cascades through the food web, impairing species reliant on clear-water conditions. In the Philippines, *C. batrachus* invasions have been linked to declines in endemic gobies (Gobiidae) and shrimp, disrupting traditional fisheries and local livelihoods (Lodge et al., 2016). Mitigation efforts, such as targeted removals and public awareness campaigns, face challenges due to the species' rapid reproduction and adaptability (Hill & Sowards, 2015). Addressing these impacts requires integrated strategies that combine ecological monitoring, stricter biosecurity, and community engagement to restore food web integrity.

**Management Recommendations:** To mitigate the ecological risks posed by invasive catfish species, banning imports of large-bodied catfish (e.g., *Bagarius* spp., *C. batrachus*) through stricter trade regulations is critical, as such species often outgrow aquaria and are prone to release into natural waterways (Evers et al., 2019). Concurrently, public awareness campaigns should emphasize the ecological consequences of pet abandonment, targeting hobbyists and vendors via workshops, signage in pet stores, and social media outreach (Lodge et al., 2016). For example, campaigns could highlight case studies of invasive catfish

disrupting local fisheries, such as *B. bagarius* predation on native fish in Iraq (Jawad et al., 2022). Combining import bans with education reduces propagule pressure while fostering community stewardship, offering a dual approach to safeguarding aquatic ecosystems.

Guidelines to prevent the introduction of unwelcome aquarium species, as well as the education of all members in the aquarium trade industry, should be brought with better authority (Knight, 2010). A competent system needs to be put in place to screen the introduction of fishes to identify possibly harmful species before their release to the aquarium market (Rixon et al., 2005).

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## CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## AUTHOR CONTRIBUTIONS

LJ; Conceptualization; formal analysis; investigation; methodology; project administration; supervision; validation; visualization; writing original draft; writing review and editing. Ahmed MHAD: Observation, obtaining information about the fish specimen. SSG: fish species identification and confirmation, reading the first draft of the manuscript. OFAS: Observation, obtaining information about the fish specimen.

## ETHICS STATEMENT

This work is based on personal fish catch. Therefore, ethical aspects are not applicable.

## DATA AVAILABILITY STATEMENT

The data supporting this study's findings are available from the corresponding author upon reasonable request.

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