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(RESEARCH ARTICLE)

A new record of North African catfish *Clarias gariepinus* (Burchell, 1822) (Siluriformes: Clariidae) in Baghdad from Tigris River

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Abstract

A single specimen of the African catfish, *Clarias gariepinus*, was recorded for the first time in Baghdad, Iraq. The specimen was caught during a fish survey to document some local species in northern Baghdad (Al-Rusafa) on March 21, 2023. The total length of the specimen was 43 cm, and its weight was 590 grams. Some biometric measurements of the specimen were studied and found to be consistent with the general characteristics of the African catfish *Clarias gariepinus* (Burchell, 1822). It is possible that the fish entered Iraqi inland waters, specifically from the Euphrates River via Syria or from the Tigris River via Turkey.

Keywords: Taxonomy; Siluriformes; Invasive Fish; Predators; Lungfish

1. Introduction

Iraq's inland waters, represented by the Tigris and Euphrates rivers and the marshes, as well as other water bodies, are known for their diversity of fish, most of which are native Iraqi species belonging to the Cyprinidae family [1]. The most widespread species in Iraq are from the Cyprinidae family, which share many morphological and environmental characteristics Hadi et al.,[2]. However, several species have been introduced to Iraq for various purposes, including the common carp (*Cyprinus carpio*), which is one of the most important aquaculture species in Iraq Ahmed et al.,[3], the grass carp (*Ctenopharyngodon idella*), introduced to Iraq from Japan in 1968 for pond farming Shireman and Smith [4], the silver carp (*Hypophthalmichthys molitrix*), the bighead carp (*Hypophthalmichthys nobilis*), the mosquito fish (*Gambusia halbrooki*), the stinging catfish (*Heteropneustes fossilis*), and the goldfish (*Carassius auratus*)[5,6]. Additionally, several invasive or non-native species have been recorded in Iraqi waters, such as *Carassius gibelio*, *Hemiculter leucisculus*, *Poecilia latipinna*, *Oreochromis aureus*, *Coptodon zillii*, and *Pangasianodon hypophthalmus* Al-Sa'adi et al., 2012 and Al-Faisal & Mutlak, 2012 and Jawad et al., 2012 and Khamees et al., 2013 and Al-Faisal et al., 2014 and Ghazwan, 2020 [7,8,9,10,11,12].

The African catfish, *Clarias gariepinus* (Burchell, 1822), is a species of high economic importance in many countries engaged in fish farming Więcaszek et al., 2010 and Aidil et al., 2016 and Romanova et al., 2018 and Fautama et al., 2019 and Zulfahmi et al., 2022 [13,14,15,16,17]. This species is widely distributed across various regions of the world Wimberger,1992 [18] and has been recorded in Syria from the Euphrates River Krupp,1987 [19], as well as in Jordan and Turkey Teugels,1986 [20]. However, there is limited information about its presence in Iraq, with only one source indicating its introduction to Iraq according to the FAO Bartley,2006 [21]. No specific reports were found except for a mention in the FishBase database Froese & Pauly, 2023 [22]. Recently, Hadi ,2023 [23] documented the presence of this species in central Iraq for the first time. This study aims to identify some biometric parameters of this non-native species after its observation and capture from the Tigris River in northern Baghdad.

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2. Material and methods

The African catfish, *Clarias gariepinus* (Burchell, 1822), was caught in March 2023 in the northern Baghdad (Al-Rusafa) area, specifically in the Gheraiat region, using standard hand nets. The specimen was transported in a cooler box for morphological examination and identification at the Natural History Museum's fish laboratory. The total length of the specimen was 43 cm, and its weight was 590 grams. External morphological measurements were taken following the methods described by Hubbs and Lagler 1964 and Teugels,1986 and Eyo and Inyang,2004 and Solomon et al.,2016 [24,20,25,26].

3. Results and discussion

- **Order:** Siluriformes
- **Family:** Clariidae
- ***Clarias gariepinus* (Burchell, 1822)**
- **Common names:** North African catfish.
- **Synonyms:** *Silurus gariepinus* Burchell, 1822
    - *Macropteronotus charmuth* Lacepède, 1803
    - *Clarias capensis* Valenciennes, 1840

Figure (1) shows the location where *Clarias gariepinus* was caught in the Tigris River in northern Baghdad, as indicated by the arrow on the map. The specimen was photographed from different angles for clarity, as shown in figures (2,3), along with images of the head from the top and bottom, as in figure (4).

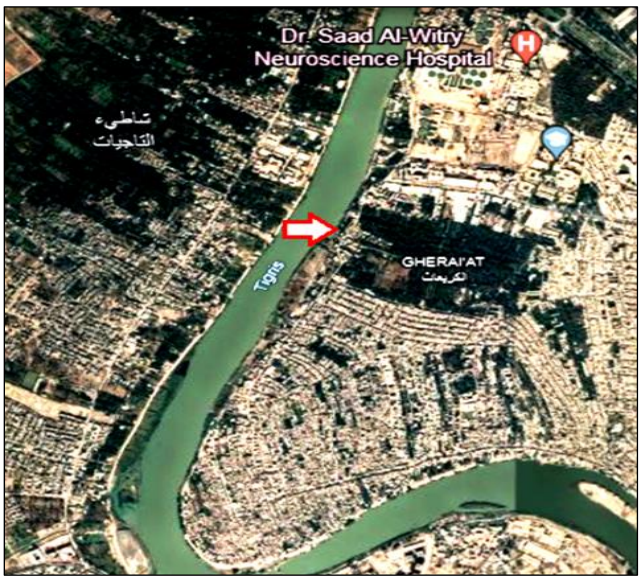

Figure 1 Fishing area

Figure 2 *Clarias gariepinus* from the side

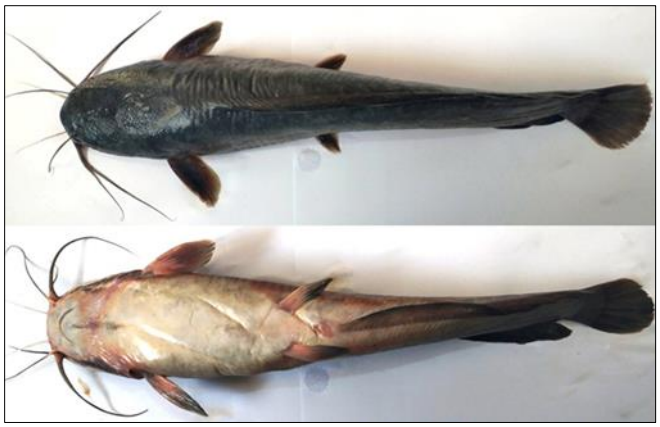

Figure 3 *Clarias gariepinus* from top and bottom

Figure 4 *Clarias gariepinus* front from the top and bottom

Table (1) presents all the biometric and morphological measurements taken for the *Clarias gariepinus* specimen caught in the Tigris River in northern Baghdad at Gheraiat area.

Table 1 Morphological and biological measurements of *Clarias gariepinus* from the Tigris River north of Baghdad

S.N	Morphometric Characters	Clarias gariepinus
1.	Standard length	36.7cm
2.	Total length	43cm
3.	Predorsal length	13cm
4.	Prepectoral length	7.5cm
5.	Prepelvic length	17.4cm
6.	Preanal length	21cm
7.	Preorbital length	2.6cm
8.	Head length	10.4cm
9.	Caudal peduncle	1cm
10.	Maximum head depth	3.3cm
11.	Maximum body depth	9cm
12.	Maximum caudal peduncle	3.3cm
13.	Maximum head width	7.1cm

14.	Pelvic fin height	3.9cm
15.	Pelvic fin base length	1.2cm
16.	Pectoral spine height	5cm
17.	Pectoral fin base length	1.9cm
18.	Anal fin base length	15.2cm
19.	Anal fin height	2cm
20.	Dorsal fin base length	23.7cm
21.	Dorsal fin height	2.5cm
22.	Inner mandibular barbel	5.4cm
23.	Outer mandibular barbel length	7.6cm
24.	Nasal barbel length	5.6cm
25.	Maxillary barbel length	10cm
26.	Inner mandibular barbel space	1.8cm
27.	2Outer mandibular barbel space	3.3cm
28.	Nasal barbel space	2.9cm
29.	Maxillary barbel space	4.3cm
30.	Premaxillary teeth band width	1.5cm
31.	Premaxillary teeth band depth	0.5cm
32.	Vomerine teeth band width	2.9cm
33.	Vomerine teeth band depth	0.8cm
34.	Mouth width	4.8cm
35.	Eye diameter	0.7cm
36	Prefrontal fontennelle length	2.5cm
37.	Frontal fontennelle length	0.8cm
38.	Frontal fontennelle width	0.5cm
39.	Preoccipital fontennelle length	3cm
40.	Occipital fontennelle length	2cm
41.	Occipital fontennelle width	1.4cm
42.	Frontal fontennelle	2.2cm
43.	Internasal space	3.2cm
44.	nterorbital space	5.2cm
45.	Maximum body width	7.1cm
46.	Caudal fin length	6.2cm
47.	Pectoral - Pelvic fin space	9.3cm
48.	Pelvic - Anal fin space	3.5cm
49.	Occipital - Dorsal fin space	12.5cm
50.	Prenasal length	1.1cm
51.	Prenasal barbel length	3.2cm

52.	Nasal - Nasal barbel space	3.2cm
53.	Nasal barbel - Orbital space	1.5cm
54.	Nasal - Orbital space	1cm
55.	Weight	590gm
56.	Gill rakers	44
57.	Sex	♂

The biometric measurements calculated for the *Clarias gariepinus* specimen in this study were consistent with most of the 34 characteristics studied for this species, as mentioned by Hadi,2023 [1], who documented its presence in Iraq for the first time, with a specimen obtained from Wasit Province. Additionally, the measurements aligned with the majority of the biometric standards studied for this specimen, which included 57 biometric measurements, as detailed in table (1). These findings are consistent with the results reported by Fagbuaro et al.,2014 and Solomon et al.,2016 [27,26] in their studies on *Clarias gariepinus* populations. This species is of high economic value across Africa, particularly in Nigeria Swain et al.,1991[28].

However, *Clarias gariepinus* is not only of high economic importance but has also become one of the most significant invasive fish species, having spread to Europe, America, and Southeast Asia Wimberger,1992 [18]. It is worth noting that these fish exhibit remarkable adaptability to environmental changes, which has contributed to their widespread distribution and high economic value. Their ability to feed on available resources, especially females during the breeding season, has been highlighted by Allendorf and Phelps,1988 [29]. Furthermore, studies on African catfish populations in Turkey have provided biological measurements similar to those of the specimen obtained in this study, with minor differences in the distribution of fin rays, as reported by Turn et al.,2005 [30].

The specimen caught in this study was male, suggesting the possible presence of females in the same area or other regions of Iraq. However, no additional specimens were obtained to support this study, particularly from Baghdad. The final size of the species in Iraq cannot be determined without more specimens from continuous fishing efforts. This would provide a clearer understanding of the species' presence in Iraq and the potential sizes it can reach in the Iraqi environment, especially since it has been observed in both the Tigris and Euphrates rivers in central and western Iraq. Documenting its true size in Iraq remains challenging, as highlighted by Eyo,2002 [31] in his study on *Clarias Scopoli*, a closely related species also found in Africa, which shares many morphological characteristics with *Clarias gariepinus*.

4. Conclusion

This study demonstrates the potential for the introducing of many alien species into Iraqi inland waters, especially since Iraq shares the Tigris and Euphrates rivers with three other countries. It is essential to conduct periodic surveys to monitor changes and biodiversity of aquatic life, especially fish. Iraq's inland waters are vulnerable to the introduction of many species that may enter through contact with water from countries connected to these rivers. We recommend that periodic surveys of various Iraqi inland waters be conducted.

Compliance with ethical standards

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Disclosure of conflict of interest

The author has no conflicts of interest.

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