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Updating checklist of fishes of Al-Hawizeh marsh, Southern Iraq until 2018

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ABSTRACT

A total of 24 species were recorded in Al-Hawizeh marsh during from June 2004 to Novmber 2018, belonging to 11 families and 22 genera, including 16 native species and (8) alien species, of which 17 species were recorded in the first study (2008) and 16, 13, 15, and 19 species were in the second, third, fourth and fifth studies (2019) respectively, Cyprinidae family recorded the highest number with nine species. Eleven common species were recorded between the studies. The cluster analysis results of the species composition in the Al-Hawizeh marsh using the Jaccard Similarity Index showed three main groups. The highest similarity percentage was among the first and second studies, which amounted to 88.2, and the lowest was between the fourth and fifth studies, which amounted to 50.0.

1. Introduction

The Iraqi marshes, which have an area twice the size of Florida's Everglades, are the largest wetlands in southwest Asia [1,2]. Southwest Asia's Mesopotamian marshes are divided into three major regions: The northern Al-Hawizeh, the southern Al-Hammar, and the Central Marshes are all rich in biodiversity and natural resources. [3,4].

Several studies have been done on the fish assemblage at Al-Hawizeh marsh, including [5], who characterized the fish assemblage three years after restoration, and [6], who studied the fish assemblage from Al-Hawizeh marsh in the Al-Saffia sanctuary. [7]. investigated the fish assemblage composition in the Al-Hawizeh marsh (Um-Al-Niaj site) [7,8]. they noted that the Cyprinidae, represented by 8 species, was the predominant family. In addition, from the Al-Hawizeh, Suq Al-Shuyuakh, and East Al-Hammar marshes, [6] found seven marine fish species in Al-Hawizeh marsh, in addition to 18 freshwater fish species. In a study conducted in the Al-Hawizeh marsh between 2005 and 2006, [8] tested 15 species, 11 of which were native and 4 foreign species. After being added to the World Heritage List, Al-Huwaizah Marsh underwent what is thought to be the first investigation into the nature of fish assemblage, according to [9]. This study aims to develop a definitive list of fish species in the Al-Hawizeh Marsh from 2004 to 2018.

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2. Material & Methods

Description of the study area

Al-Hawizeh marsh (Fig.1), which is located about 70 km from Al-Ammara city, is regarded as a water body coordinated between Iraq and Iran in terms of location and food resources. (Latitude/Longitude: 31°00'-31o45'N, 47° 25'-47o50'E) is the area's circumference. 79% of the territory is made up of Iraqi parts, and 21% of it is made up of Iranian parts[10,11]. The Maysan and Basra provinces receive 67% and 33%, respectively, of the marsh's Iraqi portion. Al-Sannaf, Um Al-Niaj, Abu-Athbah, Al-Adaim, Al-Doob, Al-Jakah, Al-Saffia, and Al-Khabta Marshes are just a few of the many bodies that can be found there. The marsh has an average area of roughly 2400 km2, which increases to 3500 km2 during the flood season and reduces to 650 km2 during the dry season, which is only present at certain times of the year. which only applies to locations with deep water. The reservoir of this marsh is 2-4 meters above sea level and contains around 7000 billion m3 of water from the neighboring Tigris [12].The following research were used to generate a comprehensive list of the species found in the Al-Hawizeh Marsh: The initial study was conducted.by Hussain et al. (2008) between June 2004 and July 2005, the second by [13].between March 2006 and February 2007, the third by [7].between January 2008 and December 2008, the fourth by [8between October 2005 and November 2006, and the fifth study [9].between December 2017 and November 2018. The following equation was used to determine the Jaccard Similarity Index (Ss%), which measures the degree of similarity between studies:

$ISJ= [a/ (a+b+c)]$ x100 [14].

ISJ: degree of similarity

a: The number of species shared by both specimens A and B.

b: Number of species present in sample A but not present in sample B

c: Number of species present in sample B but not in sample A

based on the categories and criteria of the IUCN Red List. Not Evaluated, Data Deficient, Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild, and Extinct are the nine categories into which the species are broken.

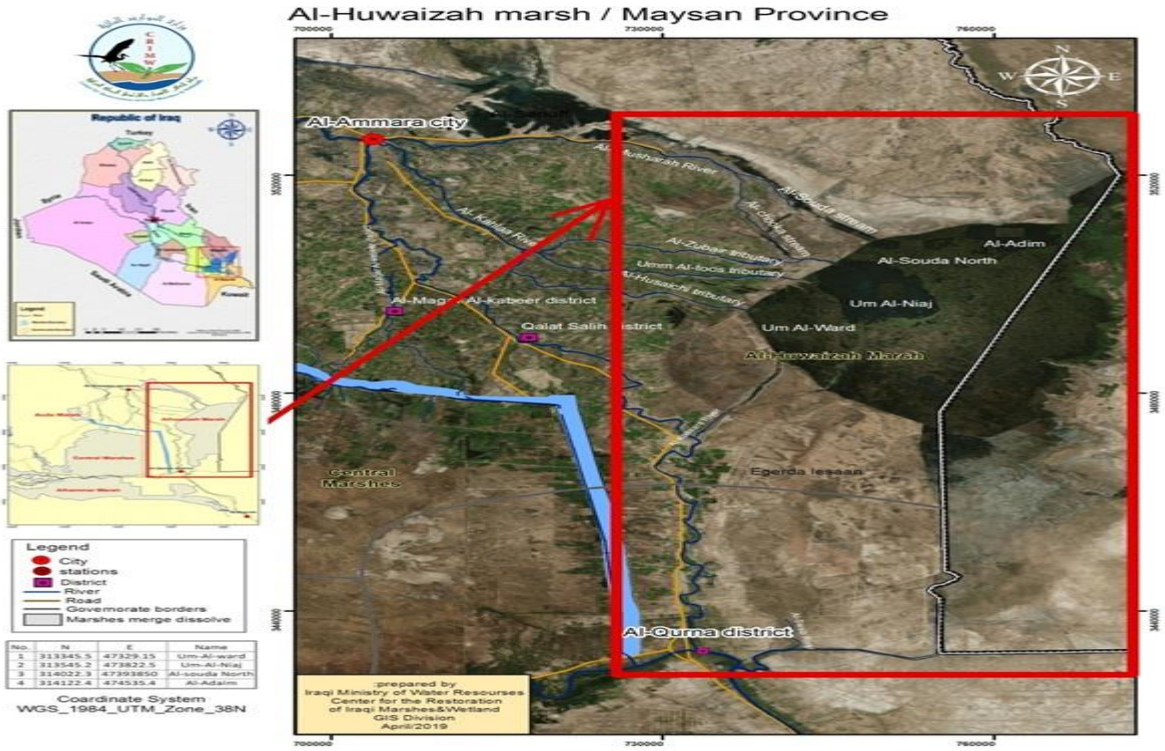

Fig 1. Map illustrating Al-Hawizeh Marsh

3. Results

In the Al-Hawizeh marsh, 24 species were recorded between June 2004 and November 2018, with 16 of them being native species and the remaining 8 being aliens: Carassius auratus, Cyprinus carpio, Ctenopharyngodon idella, Hemiculter leucisculus, Gambusia holbrooki, Coptodon zillii, Oreochromis aureus, and Oreochromis niloticus. (Table 1). All species are members of the class of fish with above-bones (Osteichthyes), of which 17 were found in the firs study, which also had 4 alien species, and 16, 13, 15, and 19 in the second, third, fourth, and fifth studies respectively, which also contained 4, 2, 3, and 7 alien species (Table 2). The Cyprinidae family has the most species (9), followed by Leuciscidae, Cichlidae, and Xenocyprididae, each with three species. The remaining families had two species apiece.

Table 1. List of fish species in Al-Hawizeh marsh

Order	Family	Species	IUCN
Cypriniformes	Cyprinidae	Arabibarbus grypus (Heckel, 1843)	Vulnerable
		Carasobarbus luteus (Heckel, 1843)	Least concern
		Carasobarbus sublimes (Coad & Najafpour, 1997)	Data deficient
		Carassius auratus* (Linnaeus, 1758)	Least concern
		Cyprinus carpio* (Linnaeus, 1758)	Vulnerable
		Cyprinion microstmum (Heckel, 1843)	Least concern
		Gara rufa (Gray, 1830)	Least concern
		Luciobarbus xanthopterus (Heckel, 1843)	Vulnerable
		Mesopotamichthys sharpeyi (Günther, 1874)	Vulnerable
Xenocyprididae		Ctenopharyngodon idella* (Valenciennes, 1844)	Least concern
		Hemiculter leucisculus* (Basilewsky, 1855)	Least concern
Leuciscidae		Acanthobrama marmid (Heckel, 1843)	Least concern
		Alburnus mossulensis (Linnaeus, 1758)	Data deficient
		Leuciscus vorax (Heckel, 1843)	Least concern
Siluriformes	Siluridae	Silurus triostegus (Heckel, 1843)	Least concern
	Heteropneustidae	Heteropneustes fossilis (Bloch, 1794)	Least concern
	Bagridae	Mystus pelusius (Solander, 1794)	Least concern

Order	Family	Species	IUCN
Mugiliformes	Mugilidae	Planiliza abu (Heckel, 1843)	Least concern
Cyprinodontiformes	Aphaniidae	Aphanius dispar (Rüppell, 1829)	Least concern
	Poeciliidae	Gambusia holbrooki* (Girard, 1859)	Least concern
Synbranchiformes	Mastacembelidae	Mastacembelus mastacembelus (Banks & Solander, 1794)	Least concern
Perciformes	Cichlidae	Coptodon zillii* (Gervais, 1848)	Least concern
		Oreochromis aureus* (Steindachner, 1864)	Data deficient
		Oreochromis niloticus* (Linnaeus, 1758)	Least concern

* Alien species

Four species are classified as (Vulnerable) by the IUCN Red List Categories and Criteria: Arabibarbus grypus, Cyprinus carpio, Luciobarbus xanthopterus, and Mesopotamichthys sharpeyi; two species, Carasobarbus sublimes, and Alburnus mossulensis, are classified as (Data deficient); and the remaining species are classified as (Least concern) (Table 2).

Table 2. List of fish species recorded in Al-Hawizeh marsh according to previous studies

Family	Species	[6] June 2004 - July 2005	[13] Mar 2006 - Feb 2007	[7] Jan 2008 - Dec 2008	[8] Oct 2005 -Nov 2006	[9] Dec 2017- Nov 2018
Cyprinidae	*Arabibarbus grypus*	-	+	-	+	-
	Carasobarbus luteus	+	+	+	+	+
	Carasobarbus sublimes	-	-	-	-	+
	Carassius auratus *	+	+	+	+	+
	Cyprinus carpio *	+	+	+	+	+

	Cyprinion microstmum	-	-	-	+	-
	Gara rufa	+	-	-	-	-
	Luciobarbus xanthopterus	+	+	+	+	-
	Mesopotamichthys sharpeyi	+	+	+	+	+
Xenocyprididae	*Ctenopharyngodon idella**	+	+	-	-	-
	*Hemiculter leucisculus**	-	-	-	+	+
Leuciscidae	*Acanthobrama marmid*	+	+	+	+	+
	Alburnus mossulensis	+	+	+	+	+
	Leuciscus vorax	+	+	+	+	+
Siluridae	*Silurus triostegus*	+	+	+	+	+
Heteropneustidae	*Heteropneustes fossilis*	+	+	+	+	+
Bagridae	*Mystus pelusius*	+	-	+	-	+
Mugilidae	*Planiliza abu*	+	+	+	+	+
Aphaniidae	*Aphanius dispar*	+	+	-	-	+
Poeciliidae	*Gambusia holbrooki**	+	+	-	-	+
Mastacembelidae	*Mastacembelus mastacembelus*	+	+	+	+	+
Cichlidae	*Coptodon zillii **	-	-	-	-	+
	*Oreochromis aureus**	-	-	-	-	+
	*Oreochromis niloticus**	-	-	-	-	+

Total number	17	16	13	15	19

The number of common species among the studies was 11: Acanthobrama marmid, Alburnus mossulensis, Leuciscus vorax, Carasobarbus luteus, Mesopotamichthys sharpeyi, Carassius auratus, Cyprinus carpio, Planiliza abu, Silurus triostegus, Mastacembelus Mastacembelus, Heteropneustus fossilis. While the species Carasobarbus sublimes, Coptodon zillii, Oreochromis aureus, and Oreochromis niloticus appeared in the fifth study, and the species Gara rufa in the first study, and Cyprinion microstmum in the fourth studies.

Results of the similarity coefficient in the species composition between the different studies using the Jaccared Similarity Index showed that the highest percentage of similarity (88.2%) was between the first and second studies, and the lowest (50%) between the fourth and fifth studies (Table, 3).

Table 3. The values of the similarity index in species composition between different studies using the Jaccared similarity index.

1	1	2	3	4
2	88.2			
3	76.5	70.6		
4	60.0	72.2	75.0	
5	65.2	66.7	60.0	50.0

The cluster analysis of the species composition in the Al-Hawizeh marsh using the Jaccard Similarity Index revealed three major groups. The first main group contained studies two and three, which had a comparable 72.0% rate. The second main category includes studies four and five, which had a similar level of 50%. The three primary groups included just study number one. (Fig. 2).

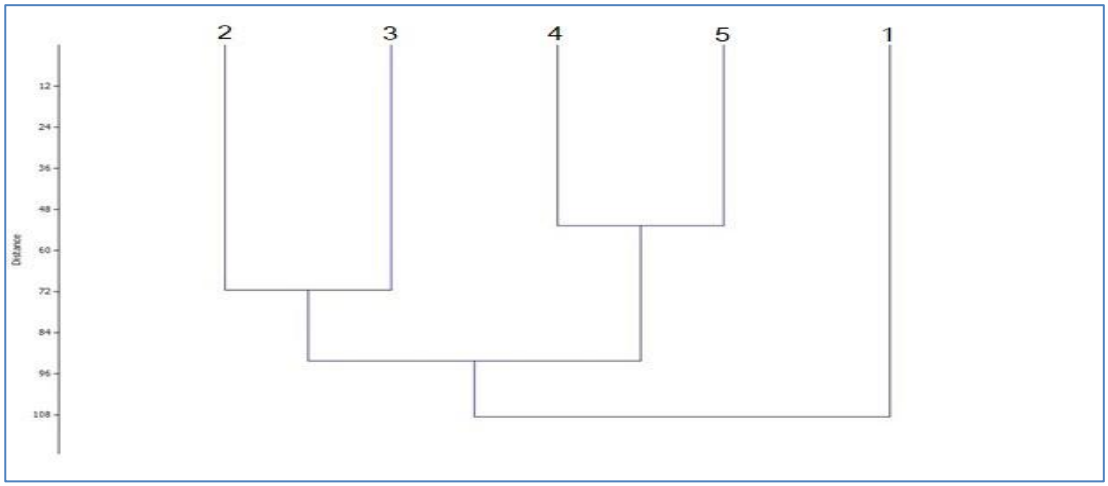

Fig 2. Cluster analysis of similarity degree among research in Al-Huwaizah marsh using the Jaccard Similarity Index

4. Discussion

Cyprinid fishes have been recorded to be dominant in terms of the number of species in many previous studies conducted on the marshes of Iraq, where recorded ten species were in the Al-Saffia sanctuary of Al-Hawizeh marsh in the study by [7]and [6] in East Al-Hammar, Suq Al-Shuyukh and Al-Hawizeh marshes, while found eight species by [7 ,8]. study [15].revealed ten species in Al-Auda marsh, whereas [16] recorded 15 species in East Al-Hammar marsh. The scientific names of species and families have been updated, and this was taken into consideration when creating the current listing. Recent research on Cypriniformes' evolutionary links has suggested a new family-level classification. Cyprinidae, Danionidae, Xenocyprididae, and Leuciscidae were recently separated into four family-level groupings in Iraq [17] As a result, there is a variation in the number of Cyprinid fish species from earlier research.

The presence of the common species in most previous studies of Al-Hawizeh marsh indicates their resistance to changes in environmental conditions, represented by four species of Cyprinidae, three species of Leuciscidae, and one species for each of Mugilidae, Siluridae, Heteropneustidae, and Mastacembelidae. The fluctuation of water levels is one of the most critical environmental factors affecting the Al-Hawizeh Marsh. Before the 1980s, the Tigris River directly overflowed into the marshes during spring flooding. The marshes spanned an area of 300,000 acres and stretched from approximately 80 kilometres north to south and 30 kilometres east to west. During the early 1980s conflict between Iraq and Iran, water was used as a military tool to shield against the advancing Iranian army, causing significant environmental and physical damage to Hawizeh Marsh.[6] The area was drained and flooded to meet military requirements. After 2003 the government and people of Iraq, with international advice and assistance, have seen about 65% of the marshes rewatered through refolding; this has aided in the revival of fish, birds, and other wildlife species, as well as habitat restoration (Iraq, 2008). However, climatic changes and dam construction in neighbouring countries have recently decreased water levels. Environmental changes also led to many exotic species in the area. [9]. Coptodon zillii, Oreochromis aureus, and Oreochromis niloticus are three Cichlid fish species found in the Al-Huwaiza wetland. The similarity coefficient also shows that the fifth study is linked to the fourth study during the cluster analysis, and thus the fifth study is more comprehensive than the previous studies, as it contains 19 species, including 7 Aliane species, and it is clear that this period was ideal in terms of moderate salinity and temperature.

5. Conclusion

We conclude that the fifth study is the most abundant in terms of the number of species and the most caught among the other four studies, representing 19 species.

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قائمة حديثة للاسماك المصطادة من هور الحويزة جنوب العراق حتى عام 2018

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معلومات البحث

الاستلام 1 أيار 2024
المراجعة 13 اب 2024
القبول 29 اب 2024
النشر 31 كانون الاول 2024

الكلمات المفتاحية

هور الحويزة، جنوب العراق، عائلة الشبوطيات، الأنواع الغريبة، قائمة بالأسماك

الملخص

تم تسجيل ما مجموعه 24 نوعاً في هور الحويزة خلال الفترة من حزيران 2004 ولغاية تشرين الثاني 2018 تنتمي إلى 11 عائلة و22 جنساً منها 16 نوعاً محلياً و(8) أنواع غريبة منها 17 نوعاً سجلت في الدراسة الأولى (2008) و16 و13 و15 و19 نوعاً في الدراسات الثانية والثالثة والرابعة والخامسة (2019) على التوالي، وسجلت عائلة الشبوط أعلى عدد بتسعة أنواع وسجلت أحد عشر نوعاً شائعاً بين الدراسات وأظهرت نتائج التحليل العنقودي لتركيبة الأنواع في هور الحويزة باستخدام مؤشر تشابه جاكارد وجود ثلاث مجموعات رئيسية وكانت أعلى نسبة تشابه بين الدراستين الأولى والثانية والتي بلغت 88.2 وأقلها بين الدراستين الرابعة والخامسة والتي بلغت 50.0

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