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Day's Goby *Acentrogobius dayi* Koumans, 1941 from the middle section of Shatt Al-Arab River, Basrah - Iraq

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Abstract

One day's goby, *Acentrogobius dayi*, was collected from a section of the Shatt Al-Arab River in southern Iraq (30° 28' 25.3812″' 'N 47° 54' 11.448 '' E), approximately 80 km north of the Arabian Gulf coast. This study is the first to record *A. dayi* in the Shatt River. Twenty morphological and meristic characters, including total length (mm), standard length (mm), body depth (mm), and others, were recorded.

Keywords: Shatt Al-Arab River, Gobiidae, *A. dayi*, Shatt Al-Arab fish, Iraqi fishes

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Introduction

Shatt Al-Arab River is a major freshwater tributary into the Arabian Gulf, formed by a conjunction of the Tigris and Euphrates at Qurna city. It flows 120 km southeast along the border between Iraq and Iran. with a width of 400–1500 m and depth of 5–15 m (Hussain *et al.*1989). Shatt subject to semidiurnal tide differences between high and low tides rose by approximately 3 m in Al-FAO city and by 1 m in Al-Maqale city (Al-Nasiri & Hoda 1975). Marine juveniles and anadromous fish migrate to Shatt, southern marshes, and inner Iraqi Rivers for spawning, feeding, and protection against large predators (Ziyadi *et al*.2015).

Eschmeyer and Fong (2015) consider the Gobiidae family one of Teleosts' largest families. Members of this family are found in various global environments (Thacker & Roje,2011). Long and large heads characterize the body. mouth extending upward. The gill hole was connected to the orbital meridian. Small canines and vanilloid teeth in the outer jaw row. The canine teeth were located at the corner of the lower jaw. elongated caudal fins. When the pelvic fins were united, a disc formed. Two rows of papillae on the cheeks start at the corner of the mouth. Round and shorter than the head and caudal fins. The dorsal fin began after the pectoral fin. The second dorsal fin commenced slightly earlier than the anal fin.

The body has large ctenoid scales posteriorly and small cycloid scales anteriorly. scales on the top of the operculum and no scales on the head. The lower sides of the body are banded in dark brown and have a greyish hue. Behind each eye, a dark band. Light blue-green dots were observed on the sides of the body. Meristic and morphometric analyses (Ziyadi *et al*., 2015). Sawa Lake has provided records for this species (Ziyadi *et al*.2015) (Jawad *et al*.2016) in the southern marsh province of Thiqar, the first record of the *A. dayi* species present in the river.

Method and Materials

On May 2022, a specimen of the day's goby *A. dayi* (110 mm, TL) was collected from Shatt, close to Al-Salheya village. (Fig.1) (30° 28' 25.3812' N 47° 54' 11.448" E) (Fig.2) A cast net was used to capture the fish specimen with a 2 cm mesh, the length of the net was 2m, and the

time of pulling the net was 2 min. Classification of specimens according to Meyer (2014) and Fricke (2014). The specimens were stored at the depth of vertebrates at the Marine Science Center, University of Basrah. Iraq.

Fig. (1) Photograph of Al-Salheya village showing the collection site of *A. dayi* in the middle section of the Shatt Al-Arab River.

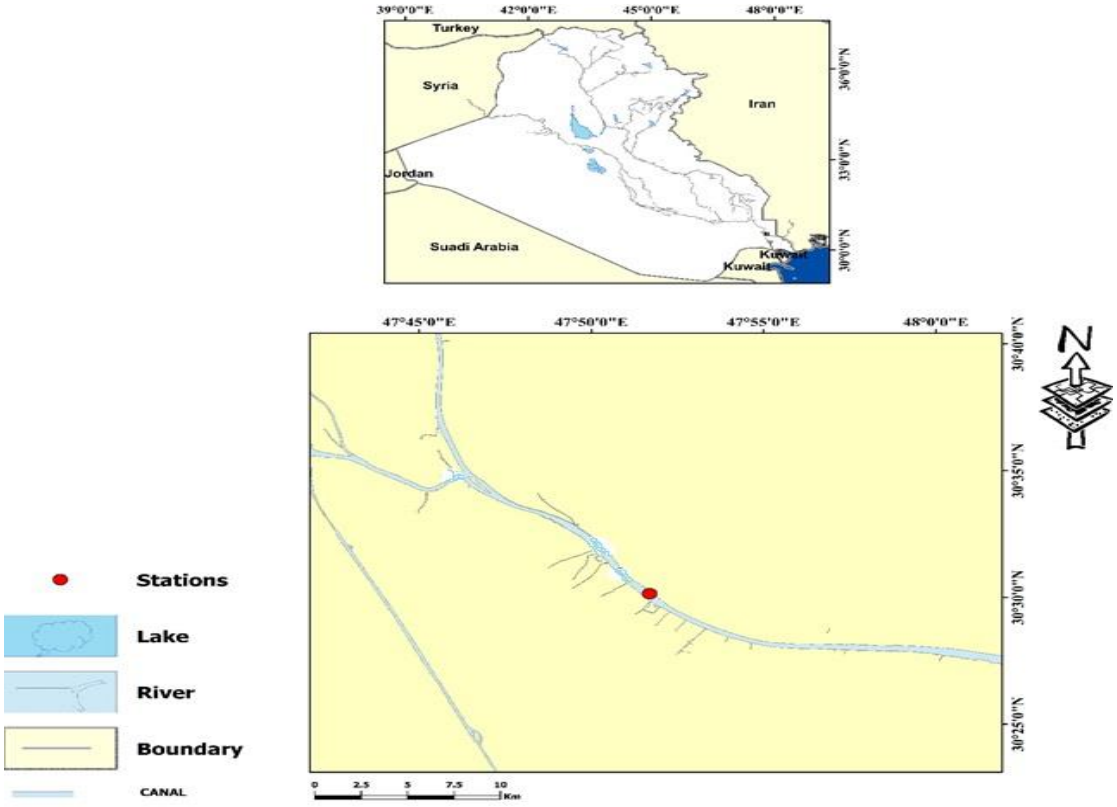

Figure (2): Location of collection of *A. dayi* near Al-Salheya village in the middle section of Shatt Al-Arab River

Result and Discussion

A. dayi (Fig,3). Classified as follows:

Order: Perciformes

Family: Gobidae

Genus:Acentrogobius Bleeker,1874

Species:*Acentrogobius dayi* koumans,1941

Fig. (3) Specimen *A. dayi*, total length 110 mm from the middle section of the Shatt Arab River.

Tables 1 and 2 show the recorded morphometric and meristic details, with a total length of 110 mm and a body depth of 14.3 mm. A decrease in freshwater inflow from the Tigris and Karun rivers to the Shatt Al-Arab River led directly to an increase in the Shatt salinity, consequently advancing coastal marine species inside Shall, accompanying the salt wedge advancing along the axis of Shatt further north. Climate change is another source of concern that facilitates the entry and occurrence of species at the expense of native species. Other factors contributed to and were considered sources of change, such as the bloom of algae in the off-season and the presence of antibacterial spread in the aquatic environment, affecting the quality of the Shatt al-Arab water. Ahmed et al. (2022) mentioned this in their study of Tilapia in the Shatt al-Arab River.

Table. (1) Important morphometric measurements of *A. dayi* specimens collected from the middle section of the Shatt Al-Arab River.

Morphometrics	**M**easurements(mm) Present study N=1	**M**easurements(mm) (Jawad et al., 2016). N=1	**M**easurements(mm) (Allen et al., 2015) N=3
Total length (mm)	110	108	77
Standard length(mm)	89	88	62.3-86
Body depth(mm)	14.3	16.59	13.1-15.1
Body width(mm)	9.4	14.62	-
Head length (mm)	17.45	24.33	18.9-24.7
Head depth (mm)	11.3	15.78	-
Snout length(mm)	9	7.34	5-6
Eye diameter(mm)	1.62	4.49	-
Interorbital distance(mm)	4.23	2.20	3.1-4.1
Dorsal fin length(mm)	27.21	38.61	-
Pectoral fin length(mm)	8.37	19.33	12-17.8
Pelvic fin length(mm)	7.63	16.88	13.1-22.9
Anal fin length(mm)	8.3	17.16	-
Caudal peduncle length (mm)	11.34	21.36	-
Caudal peduncle depth(mm)	3.56	9.18	-

Table. (2) Meristic measurement Counts for *A. dayi* specimens collected from the middle section of the Shatt Al-Arab River.

Meristic	Measurements(mm) Present study N=1	Measurements(mm) (Jawad et al., 2016). N=1	Measurements(mm) (Allen et al., 2015) N=3
1st Dorsal fin rays	5	7	6
2nd Dorsal fin rays	1/9	1/10	1/9-1/10
anal fin rays	10	9	1/9
Pectoral fin rays	21	18	17R + 18L
Pelvic fin rays(fuse fin)	11	10	1/5R+1/5L

After conducting the PCA analysis of the morphological characteristics of the species and comparing them with the morphological characteristics of the same species in other studies, it was found that they tend to have positive morphological similarities with a strong correlation from the point of origin, except a small number of characteristics, includes the lengths of the Pectoral fin (Pfl), Pelvic fin (Plfl), and Anal fin (Afl). (fig.4)

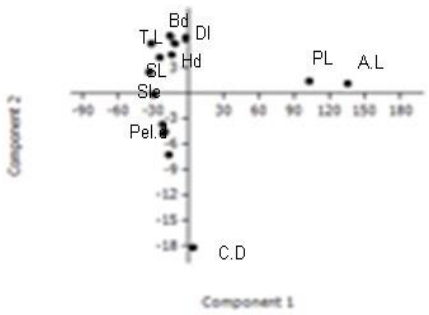

Figure.4 PCA examination of the morphological traits considering the species evaluated in the present study and a comparison with earlier studies.

In the present study, we found that the chest ray was 21m m, which agrees with Jawad *et al*. (2016) during a recording in Dhi Qar, 18 mm, and with the study of Allen *et al*. (2015) during the first registration of the species on Batanta Island in Indonesia, where it recorded 17 mm. This does not agree with the study by Allen *et al*. (2015) on length, as the standard for the species was recorded as 17-33.8 mm, whereas in the present study, it was 88 mm. This study had some characteristics similar to those of previous studies, such as a body depth of 14.3 mm and agrees with the study of Jawad *et al*. (2016).as it records 16.59 and Allen *et al*. (2015) recorded 14.2 mm. This species may have entered Shatt Al-Arab for the first time because of the climatic changes that we experienced these days, as the temperature was recorded at 44C^{o}, and the salinity concentration was high, it was recorded at 25 ppt, and a decrease in freshwater from its sources. The tidal current enters from the Arabian Gulf towards the upper reaches of the Shatt al-Arab River through the tides, as reported by Zhong and Chen (2009). During the entry of this species from marine waters into Chinese freshwaters, Randall (1995) and Froese and Pauly (2016) suggested that the maximum length of this species is 110 mm. This is consistent with the present study, as 110 mm was recorded for the species in the river, which agrees with Ghanbarifardi and Malek (2007). mm from the Arabian Gulf coast of Iran (109 mm TL). This indicated that this was the final length of the species. *A. dayi* is a high-salinity tolerant species that lives in coastal marine waters, and its entry during the tide to the Shatt Al-Arab River has been recorded for the first time. In the PCA analysis of the Canoco program, it was found that all phenotypic traits are close and largely similar in Morphometrics and Meristic the positive part between the species in the present study and previous studies expect these traits to be negative. In previous studies, this type did not appear in the checklist of previous years in Shatt al-Arab, and it seems that the high salinity found this species in its environment**.**

CONCLUSION

The species *A. dayi* was recorded from the Shatt al-Arab River environment as an invader for the first time because of the increase in salinity due to climatic changes.

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تسجيل اول لسمكة *Day's Goby, Acentrogobius dayi Koumans, 1941* في شط العرب جنوب العراق

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المستخلص

تم جمع عينة واحدة من سمكة، *Acentrogobius dayi*، من شط العرب جنوب العراق (30 ° 28 '25.3812 " ° *47 N* *54' 11.448" E*) على بعد حوالي 80 كم من الخليج العربي. تعد هذه الدراسة هي الأولى من نوعها لتوثيق *A. dayi* على ضفاف النهر. تم تسجيل عشرين صفة مورفولوجيًة وعددية، بما في ذلك الطول الكلي (ملم)، والطول القياسي (ملم)، وعمق الجسم (ملم)، وغيرها.

الكلمات المفتاحية: شط العرب، القوبيون، النوع، *A. dayi*,اسماك شط العرب ، اسماك العراق