

## Investigation of changes in the fish assemblage building and abundance in the Garmat Ali River, Southern Iraq

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### Abstract

The current study was conducted to study fish assemblage composition and population structure changes from Garmat Ali River from January to December 2020. Some ecological variables, including temperature, salinity, pH, and dissolved oxygen, were estimated. Altogether, 2168 fish specimens represented 32 species, 26 genera, and 17 families. There were eleven freshwater species, three in June and nine in May. The exotic species ranged from five to seven in June, October, and December. Fourteen species were marine, ranging from one in December to eight in June. Four species preceding the numerical relative abundance in the Garmat Ali River *Trayssa whiteheadi*, *Carassius gibelio*, *Planiliza abu*, and *Oreochromis aureus* formed 15.50, 15.18, 12.82, and 10.79%, respectively. The diversity index (H) ranged from 1.97 (June) to 2.77 (May), with an overall value of 2.29. The evenness index (J) varied from 0.70 (November) to 0.88 (May and December), with overall values of 0.81. The richness index (D) fluctuated between 2.24 (June) and 3.41 (May), with overall values of 2.98. The study concluded that the composition of the fish assemblage and abundance has changed compared to previous studies, particularly older studies, due to the introduction of many exotic species into the river's fish community, the occurrence of marine species due to increased salinity concentrations, and the departure of sensitive freshwater native species.

**Keywords:** Fish Community, Tigris, Assemblage, distribution, Inland water.

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### Introduction

Fish are well-known vertebrates, having the most diverse group (Mouludi-Saleh et al. 2020), with marine and freshwater species inhabiting diverse ecological systems in various habitats and regions (Yang et al. 2021). Many freshwater fish species are typically threatened by the demolition and fragmentation of their habitat (Heidari et al. 2013), and their diversity is affected by exotic fishes (Çiçek et al. 2022). The occurrence and increased abundance of fish in the river's ecosystems reflect the health status of the river, especially the sensitive species that are considered indicators of the stability of the riverine ecosystem (Wu et al. 2019). The freshwater fish group includes about 15935 species, constituting less than 1% of the earth's surface. The marine fish species, numbering about 15940 species, occupy 71% of the planet, whereas 3149 species inhabit brackish water or are diadromous (Froese and Pauly 2022). In contrast to marine and terrestrial ecosystems, freshwater ecosystems are suffering from species threats due to climate change, which has caused declines in water quantity and quality and increased pollutant concentrations from human activities (He et al. 2021).

The Garmat Ali River is a short river north of Basrah, southern Iraq, and empties into the Shatt Al-Arab River. It originates at the confluence of the Al-Mashab and Al-Salal branches. Before the meeting, the two branches pass for about 20 km through the Al-Hammar Marsh. The river continues for about 6 km before joining the Shatt Al-Arab River at the northern tip of Sinbad Island, north of Basrah City (Mohamed et al. 2017; Aldoghachi and Abdullah 2021). Like other rivers and aquatic habitats, the river under investigation suffers from human influences due to waste spilling into the river from anthropogenic activities.

The last studies mentioned that several fish species became scarce or were subjected to extinction from the habitats of Basrah Province due to human activities, climate change, increased salinity, and pollutants