Study of Fish Assemblage Structure in the Garmat Ali River, South Iraq

By

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Summery

The present study describes the composition of fish assemblage of the Garmat Ali River by adopting the ecological indices, and focusing on the changes in the structure of fish assemblage and the environmental factors. The ecological status of the river was evaluated by applying water quality index (CCME-WQI) and fish integrated biological index (F-IBI).

Water and fish samples were collected on monthly basis, from the three stations during the period from November 2015 to October 2016.

The study showed that air temperature ranged from 17.3ºC in December to 35.7 ºC in September, water temperature varied from 14.3 ºC in December to 32.7 ºC in September, transparency fluctuated from 17.7cm in July to 55.0cm in January, salinity ranged between 1.5‰ in June to 6.0‰ in December and the pH varied from 7.2 in August to 8.3 in November. Water quality index of the river was classified as marginal (WQI= 49.5%).

A total 34 fish species belonging to 26 genus and 16 families were caught using seine net, fixed gill net and electro-fishing, all species belong to Osteichthyes. Cyprinidae is a dominant family represented by seven species.

The number of species caught was 9 in January and 25 in May. The fish fauna consisted of 18 marine, eight native and eight exotic species. The resident species consisted of 14 species, three species seasonal and 17 species occasional. *Poecilia latipinna* was the most abundant species numerically and in weight comprising 57.66% and 35.45%, respectively, followed by *Tenualosa ilisha* (15.29%, 22.38%). The third position in number was occupied with *Thryssa whiteheadi* (7.96%), but *Carassius auratus* in weight (10.16%). The dominance value (D3) for the more three abundant species in number (*P. latipinna, T. ilisha* and *T. whiteheadi*) was 80.91%, while in weight was 67.99% for *P. latipinna, T. ilisha* and *C. auratus*.

The overall numerical diversity index ranged from 0.47 in February to 1.66 in October, but the weight diversity index ranged between 0.79 in February and 2.05 in April. The overall numerical evenness index varied from 0.23 in February and 0.63 in October, and the weight evenness ranged between 0.37 in February and 0.73 in November. The overall richness index ranged from 1.05 in February to 2.26 in April.

Associations between the numbers of species and individuals of fish and the environmental variables were clarified by using canonical correspondence analysis (CCA). The analysis was indicated that *T. whiteheadi, T. vetrirostris, Coptodon zilli , Oreochromis aureus C. auratus* and *T. ilisha* have been associated with water temperature, and *P. latipinna* has been associated with salinity.

Cluster analysis reveals five main groups according to the Jaccared similarity index and three major groups according to Schooner' s similarity index.

The integrated biological index (IBI) scores were calculated from 15 separate assemblage metrics based on the fish species richness, species composition and trophic guilds. The ecological status of the river was found to be impaired (F-IBI=46.5%).

The study shows that the deterioration of the water quality of the Garmat Ali River during the last years, which reflects the deterioration of the water quality of both Shatt Al-Arab and East Hammar marsh, has affected on the composition of fish assemblage of the river fish in terms of the decrease in the number of native or endemic species and the increase in the numbers of marine and exotic species. This is confirmed by the value of F-IBI, which reflect the state of the ecological disturbance of the river.