

**ORL- EB&C-18****Studies on Fish Community Structure and Ecological Degradation of Keshaliya and Singhiya Rivers in Morang District, Koshi Province, Nepal.**

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A comprehensive study was conducted from May 2022 to April 2024 to assess the fish community structure and water chemistry of two rivers, Singhiya and Keshliya, in the Morang district of Koshi province, Nepal. These rivers originate from the Siwalik hills and collect water from Charkose Jhadi on their route towards the south before emerging into the cultivated plain of Tarai. Keshaliya flows in the west and Singhiya east of the industrial metropolitan city Biratnagar, carrying pollutants from industries and an industrial corridor extending from Itahari to the Joghani Indian border.

Both rivers exhibited signs of ecological degradation due to habitat deformation and water pollution from anthropogenic activities, resulting in alterations in the fish community structure. It was noted that over the past three decades, more than 55% of locally available fish species in these rivers have been experiencing pollution-related threats. The nets used for fishing were gill or drag net with floats and sinkers. The sampling efforts were similar in all sampling sites. Some of the most threatened fish species due to water pollution and habitat loss include *Cyprinon semiplotus*, *Septipinna phasa*, *Puntius chola*, *Puntius ticto*, *Puntius sarana*, *Puntius terio*, *Puntius gonionotus*, *Salmostoma phulo*, *Barilius vagra*, *Garra mullya*, *Psilorhynchus sucatio*, *Acanthocobitis botia*, *Aorichthys aor*, *Glyptothorax alaknandi*, *Glyptothorax indicus*, *Sisor rheophilus*, *Chaca chaca*, *Brachydanio rerio*, *Danio dangila*, *Barilius tileo*, and *Pangio pangia*. These fish species were commonly available until two decades ago. A few migratory fish species such as *Rita rita* and *Aorichthy seenghala* have made their appearance rare.

Among the most threatened fish species, bottom feeders stand in the first position on the list. The scales, fins and gills of the fish species caught during study period were examined thoroughly to detect the effects of pollutants. Gill sections of a few fish species were studied under the light microscopes. The effects of detrimental chemicals present in polluted waters were observed in the gill structures. Swollen tips of primary lamellae, hooklike secondary lamellae, collision of some of the secondary lamellae were the signs effects of pollution. Movements of some fish species collected from polluted river water and the same fish species collected from unpolluted water, keeping them in freshwater aquariums were observed and their activities were noted. To make a comparative study of oxygen uptake rate from water of *Channa punctatus* of the same weight and length collecting two from unpolluted water and two from polluted river was measured using a cylindrical respirometer. The results indicated that oxygen uptake of the fish collected from polluted water was comparatively less indicating the malfunctioning of respiratory organ, the gills. To evaluate pollution of the rivers fifteen kilometers within Biratnagar metropolitan city were selected and marked as upstream, midstream and downstream to collect water samples for analysis. The dissolved oxygen contents of both the rivers waters could not remain constant year-round. In dry season it dropped down when water volume in the rivers decreased and water temperature increased. During rainy season (June-July) the water volume in the water in river increases by the time, pollutants load in the river water also increases resulting slight decrease in DO. The average BOD level recorded in both rivers was more or less similar, the above findings indicate that both rivers by the position of their routes cannot be remain being pollution free. Therefore, an urgent well-planned management program to safeguard and enhance fish production in these rivers is needed.