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## Structural alterations by accumulation of heavy metal pollutants in scales of different fish species from Harike Wetland (Ramsar site), India

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Wetland ecosystems are being degraded due to discharge of toxic effluents from industries. Pollutants are posing serious threats to the variety of flora and fauna existing there. Fish fauna which is important from ecological as well as economical point of view is facing threat due to the discharge of these pollutants. Harike wetland (Ramsar site) is known for its commercial fishery resources as many commercially important fishes are existing there. It is situated at the confluence of the two major rivers Sutlej and Beas. It is an important source of water supply for drinking and irrigation purposes to the states of Punjab and Rajasthan. The river Sutlej routinely receives contaminated water from Budha Nallah which is a tributary of this river. Various industrial effluents and heavy metals from Ludhiana city are released into Budha Nallah which ultimately reaches at Harike wetland through the river Sutlej. They pose a serious threat to the fauna existing in this wetland by bioaccumulation in the food chain. During the present investigations the most common heavy metals detected in water of Harike wetland are cadmium (Cd), chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), zinc (Zn), iron (Fe) and aluminum (Al). Some other pollutants like carbon (C), sulphur (S) and silicon (Si) were also detected in scales. The occurrence of these metals is different in different fish species. The purpose of this study was to investigate the presence of heavy metal (Cu, Zn, Pb, Ni, Cd, Cr, Fe and Al) concentration in the scales of five fish species (*Labeo rohita*, *Catla catla*, *Cirrhinus mrigala*, *Labeo calbasu* and *Cyprinus carpio*) of Harike wetland. These heavy metals were assayed from the scales by employing energy dispersive X-ray microanalysis (EDX) and Scanning Electron Microscopy (SEM) of the surface structures of scales. The damage was in the form of uprooting of lepidonts from the anterior side of the scale and disruption of circuli, thus resulted in the loosening of the scales from the body of the fish. Presence of these metal pollutants caused alterations in calcareous structure of the scales and elemental composition of scales, thus appointing fish scales as reliable pollution indicators in the waters of Harike wetland.

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