

## ABSTRACT

For organisms to thrive, freshwater is an essential resource. Many freshwater fish are harvested annually from Pakistan's freshwater bodies. *Catla catla* is a member of the Cyprinidae family, which has more genera and varieties than any other family. The black *Catla catla* has a silvery white belly and a dark grey tail and fins. It is one of Pakistan's most significant carps in terms of commerce. Because it consumes phytoplankton and zooplankton, it lives in freshwater environments that are abundant in plankton. Due to changes in their aquatic environment, fish are very sensitive to their surroundings and adapt their bodies accordingly. Morphometric analysis is a basic method for studying fish health in an environment. In order to understand the patterns of phenotypic plasticity within distinct unit fish stocks of the same species, morphometric variation is crucial. In addition to morphometric analysis, cranium studies help identify intraspecific differences. Important information regarding interspecific variation between populations of the same species can be obtained from craniometric data. Intraspecific morpho-craniometric changes result from the alteration of aquatic ecosystems brought about by human activity, inadequate management, and decreased food supply. A total of 20 samples of *Catla catla* were taken from two different habitats for morpho craniometric analysis. The current investigation found that total length and every other morphometric measure were positively correlated at both sites. At both sites, there was a strong association between overall length and the majority of the other morphometric characteristics. The effect of environment on the link between total length and other morphometric features at both sites was predicted by a moderate and weak correlation between total length and several other morphometric variables. Additionally, there was a favorable link between the two sites' craniometric characteristics and skull length. Concerns regarding the environmental conditions of both wild and farmed habitat were raised by the regression coefficient b value for both morphometric and craniometric features, which revealed negative allometric growth at both sites. Because of the serious pollution of water bodies and inadequate management, this situation will only get worse in the future. The presence of extremely negative allometric growth along the pond's edge suggests that the pond is not suitable for *Catla catla* growth. Poor maintenance, a lack of food, or environmental stress could be the causes of the pond's higher negative allometric growth. The current study will give aquaculturists, taxonomists, and pond managers baseline data so they can closely monitor *Catla catla* growth.

**Key Words:** *Catla catla*, Morphometrics analysis, Craniometric analysis, interspecific variation, phenotypic plasticity.