

Decline in abundance and distribution of *Limbochromis robertsi* (Teleostei: Cichlidae), an endangered cichlid fish endemic to Ghana, West Africa

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Limbochromis robertsi is an endangered freshwater cichlid fish species with a distribution limited to the upper tributaries of the Pra River in Eastern Ghana. The land cover in most parts of its range has undergone substantial changes. Deforestation and forest fragmentation in the Eastern Region of Ghana accelerated dramatically in the last 20 years, with the majority of the forest loss along the banks of rivers and creeks due to artisanal small-scale mining (primarily for gold) and agriculture. Field surveys showed a decrease in the total population of *L. robertsi* by more than 95% from the early 1990s to 2021. A small population which has been found about 20 years ago in the Western Region of Ghana was not found again. Because of the great decline of the species a stronger conservation and conservation status for it are suggested, as well as breeding programs combining in-situ and ex-situ methods. Potential habitats for re-establishing populations of *L. robertsi* were also investigated.

Introduction

The cichlid *Limbochromis robertsi* (Fig. 1) is endemic to Ghana, West Africa. It has been known to occur in a number of creeks in the Eastern Region between the villages of Kyebi (also referred to as Kibi) and Asiakwa, mainly within the region of the Atewa Forest (Lamboj, 2000).

Further research on this endangered species (EN, according to IUCN – Dankwa et al., 2020) started in the early 1990s, mainly dealing with the ethology, distribution and generic position of the species (Lamboj, 1993) and later, adding some more systematic and phylogenetic aspects (Lamboj, 1997). For these studies, populations of the Black Krensen Creek and Red Krensen Creek – both close to Kyebi – and one additional creek nearby the village of Sagymase have been used.

In 1998 another small population was discovered in the Draw River Forest and the Ankasa River in the west of Ghana by U. Schliewen from the Zoologische Staatssammlung Munich (ZSM) who deposited the specimens under the catalogue numbers ZSM 20890 and ZSM 20894.

For the following years, no further studies or explorations targeting *Limbochromis robertsi* were undertaken. Only very recently, in 2016 and also in 2018, some additional explorations focusing on the distribution of the species were undertaken, revealing large changes in habitat structure (see Fig. 2) and a strong decrease of all populations around Kyebi, which was probably caused by increasing deforestation, road building and illegal gold mining in the greater Kyebi area and a subsequent high increase of human population size in this area (Lamboj et al., 2020).

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