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Exploring the Morphometry of Cichlid Fish Teeth to Evaluate their Potential as an Environmental Proxy

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East African cichlid fishes are a role model for rapid adaptive radiation. An important aspect of their diversification is trophic specialization, which is linked to the diverse food sources available. Especially jaw and tooth morphology are related to feeding strategies of the fishes. This food availability is in turn determined by ecological factors. Thus, the fossil remains of past cichlid communities potentially provide valuable information on past ecosystem complexity and its response to environmental changes. In order to use fossil fish teeth stored in the Lake Challa sediments as indicators for climate-driven dynamics of the local ecosystem, a consistent and reliable method for the quantitative analysis of cichlid fish teeth morphology needs to be developed. The aim of this study is to gain an understanding of the tooth shape variety developed by members of the two extant cichlid fish tribes Tilapiini and Haplochromini in the Lake Challa. Special attention was played to the transitional change of morphology relative to the position of the teeth in the jaw. The findings were then compared to the results of statistical morphometric analysis. The results of the study point out that the overall tooth morphology between the two members of the extant tribes is significantly distinct. Thus it is probable that the fossil teeth can as well be placed in the corresponding group to reconstruct past cichlid communities. The descriptive analysis here may serve as an orientation for the later identification and analysis of the fossil teeth in the sediment core. The result of the statistical analysis resembles findings from the qualitative analysis of cusp morphology quite well. It suggest however, that enhancements and the extension of the shape digitization to the neck of the teeth are required to enable the reliable distinction between teeth of the genera within the morphospace of quantitative shape analysis.