

Publication

Point-Combination Transect (PCT): Incorporation of small underwater cameras to study fish communities

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 4526126

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Year 2019

Title Point-Combination Transect (PCT): Incorporation of small underwater cameras to study fish communities

Journal Methods in ecology and evolution

Volume 10

Number 6

Pages / Article-Number 891-901

Keywords cichlid fish; community ecology; comparative analysis; diversity; lake tanganyika; monitoring; sampling; underwater visual census

Available underwater visual census (UVC) methods such as line transects or point count observations are widely used to obtain community data of underwater species assemblages, despite their known pitfalls. As interest in the community structure of aquatic life is growing, there is need for more standardized and replicable methods for acquiring underwater census data. Here, we propose a novel approach, Point-Combination Transect (PCT), which makes use of automated image recording by small digital cameras to eliminate observer and identification biases associated with available UVC methods. We conducted a pilot study at Lake Tanganyika, demonstrating the applicability of PCT on a taxonomically and phenotypically highly diverse assemblage of fishes, the Tanganyikan cichlid species-flock. We conducted 17 PCTs consisting of five GoPro cameras each and identified 22,867 individual cichlids belonging to 61 species on the recorded images. These data were then used to evaluate our method and to compare it to traditional line transect studies conducted in close proximity to our study site at Lake Tanganyika. We show that the analysis of the second hour of PCT image recordings (equivalent to 360 images per camera) leads to reliable estimates of the benthic cichlid community composition in Lake Tanganyika according to species accumulation curves, while minimizing the effect of disturbance of the fish through SCUBA divers. We further show that PCT is robust against observer biases and outperforms traditional line transect methods.

ISSN/ISBN 2041-210X

edoc-URL <https://edoc.unibas.ch/74475/>

Full Text on edoc No;

Digital Object Identifier DOI 10.1111/2041-210X.13163

PubMed ID <http://www.ncbi.nlm.nih.gov/pubmed/31244987>

Document type (ISI) Journal Article