

Comparison of Length-Weight Relationship and Condition Factor of Three Fish Species between Regulated and Natural Rivers

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ABSTRACT: Batang Rajang and Batang Baleh are two of the main rivers located in Sarawak, Malaysia. Both rivers used to be a natural river system. However, after the impoundment of Bakun Hydroelectric dam in 2004, the flow regime in Batang Rajang was transformed into a regulated flow. This change in flow regime had a potential to leave some impacts on the fish community. Therefore, this study utilizes the Length-Weight Relationship (LWR) together with condition factor (K) to determine the impact of regulated flow towards the fish community by comparing it to the natural flow regime. Prior to this study, no attempt has been conducted to compare the growth pattern of these species that are present in both river systems. The main objective of this study was to record and compare the differences in LWR of these species between Batang Rajang and Batang Baleh. The species selected for this study are *Barbonymus schwanenfeldii*, *Cyclocheilichthys armatus* and *Parachela oxygastroides*. Samples were collected using gill net from various mesh sizes. The formula used for the LWR is $\log W = \log a + b \log L$. The results showed that individuals from all three species that lived in natural river showed a clear single LWR curve, meanwhile individuals that lived in regulated river showed scattered LWR curve. The LWR and K factor of *B. schwanenfeldii*, *C. armatus* and *P. oxygastroides* differ between Batang Rajang and Batang Baleh indicating regulation of river flow has impact on the fish community.

KEYWORDS: Length-Weight Relationship; Condition factor; *Barbonymus schwanenfeldii*; *Cyclocheilichthys armatus*; *Parachela oxygastroides*

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INTRODUCTION

Batang Rajang and Batang Baleh are two of the main rivers located in Sarawak. Although both rivers used to be natural rivers, Batang Rajang was transformed into a regulated flow after the impoundment of Bakun Hydroelectric Dam in 2004. The change in flow regime was thought to have a great potential on leaving impacts towards the fish community. Kiernan et al. (2012) stated that flow is very important and is the major variable in determining all biotic composition.

The length-weight relationship provides a good assessment tool to investigate the situations between these river systems. Hamid et al. (2015) and Khristenko & Kotovska (2017) reported that LWR is widely used by fishery researcher to predict the wellbeing of fishes between groups spatially or temporally in natural population. The main objective of this study was to record and compare the differences LWR of fish of the same species between Batang Rajang and Batang Baleh.

BACKGROUND THEORY

According to Wotton (1991), fish showing b value > 3 indicates that it is becoming heavier in comparison to its length, meanwhile b value < 3 indicates that it is becoming lighter in comparison to its length. Finally, if b value remains exactly at 3, the fish is retaining an isometric growth. Barnham and Baxter (2003) proposed K factor values as follows: $K = 0.80$ -very poor, $K = 1.00$ -poor, $K = 1.20$ -average, $K = 1.40$ -well-proportioned and 1.60 -excellent.