

Length–weight relationships of eight Asian freshwater fish species in Nam Theun 2 Reservoir (Laos PDR)

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Summary

Length–weight relationships (LWRs) were determined for eight Asian freshwater fish species that were not yet recorded in any peer-reviewed journal indexed in the Web of Science or the FishBase database. Fish specimens from Nam Theun 2 reservoir in Lao PDR, were collected from April 2012 to August 2016 using several methods to cover a large size-spectrum for each species. For LWRs using the general equation from Beckman (1948), the parameter *b* (slope value on the growth pattern) ranges from 2.908 (*Puntius brevis*) to 3.429 (*Rasbora paviana*). This study provides an update in maximum lengths for two species and first LWRs for eight common freshwater species found mainly in reservoirs, and thus represents a means for further population dynamic evolution analyses and local fisheries management.

1 | INTRODUCTION

Inland fisheries are important for both food and income in Asian countries (IfreDi, 2013; Lymer, Funge-Smith, Clausen, & Miao, 2008; Phonvisay, 2013). As in natural ecosystems (e.g., Mekong River and tributaries), man-made ecosystems (e.g., rice field, irrigation, hydro-power reservoir) are strategic sites for inland fisheries (Bhukaswan, 1980). These latter ecosystems are numerous. For example, a total of 78 hydropower reservoir sites (created, under construction, or planned) were identified in Lao PDR in 2000 (Roulot, 2014). In these reservoirs, fisheries are recognized or foreseen to play a significant role in local development (income or subsistence). In spite of this importance, biological data of the main exploited species remain scarce, especially in Lao PDR.

Knowledge of the biology of the main species found in the reservoir is requisite information for fisheries resource management (Blackwell, Brown, & Willis, 2000; Kamaruddin et al., 2012; Tobes, Miranda, Pino-del-Carpio, Araujo-Flores, & Ortega, 2016), especially the length–weight relationship (LWR; Pitcher & Hart, 1982). The LWRs of the principal freshwater species in Asia are usually available for natural ecosystems and from some reservoirs in Malaysia (Hamid, Mansor, & Nor, 2015; Kamaruddin et al., 2012; Martin-Smith, 1996), Thailand (Sidthimunka, 1973), Philippines (Garcia, 2010) and India (Khan, Khan, Miyan, & Mubark, 2011; Kumar et al., 2013; Kumary & Raj, 2016). The LWRs are also recognized as differing according to the ecosystems and

the geographical regions and to evolve under freshwater habitat transformations (river vs. reservoir) and fisheries development. The aim of the study was then to enhance knowledge of the main species found in Lao PDR, especially for reservoirs ecosystems.

The present study provides information on the LWRs of eight fish species, including some of commercial interest in the second largest Lao reservoir, Nam Theun 2 (central Lao) impounded in 2008, and not yet recorded in any peer-reviewed journal indexed in the Web of Science or in the FishBase database.

2 | MATERIALS AND METHODS

From April 2012 to August 2016, fish were collected from different stations of the Nam Theun 2 reservoir (17°48'N; 105°6'E) during surface gillnet surveys (gill nets: 25 × 2 m; mesh size: 10, 15, 20, 25, 30, 35, 40, 50, 60 and 70 mm between knots) conducted on a monthly basis in two reservoir stations and a quarterly basis in three additional stations (NTPC, 2014). Main features of the Nam Theun 2 area are presented in detail in Descloux, Guedant, Phommachanh, and Luthi (2016), and map and fish sampling stations in Cottet, Descloux, Guédant, Cerdan, and Vigouroux (2016). To strengthen the dataset for larger and smaller individuals, additional data were collected. Thus, from August 2015 to August 2016, random samples of 10 individuals per fish species caught by local fishers were collected at the Nam