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ORIGINAL ARTICLE

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Early life history of yellow puffer, Chonerhinos naritus (Richardson, 1848) from Sarawak, Northwestern Borneo

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Abstract

The growth and morphological development including fins, spine distribution and pigmentation of larval and juvenile of hatchery-reared yellow puffer, *Chonerhinos naritus* were described to provide essential information on the early life history of this species. The total length (TL) of newly hatched larvae was 3.42 ± 0.23 (mean ± *SD*) mm, reaching 5.66 ± 0.38 mm on 5 days after hatched (DAH), 7.80 ± 0.28 mm on 11 DAH, 9.88 ± 0.40 mm on 27 DAH and 10.92 ± 0.58 mm on 30 DAH. The yolk was completely absorbed in preflexion larvae at 4 DAH. The mouth opening started at 3 DAH of yolk sac larvae, while the teeth appeared starting from preflexion larvae at 7 DAH. Overall aggregate fin ray numbers including caudal fin attained full complement in postflexion larvae at 27 DAH. Several melanophores with appearance of small stellate were first appeared dorsally on the head of flexion larvae at 13 DAH, expanded at the dorsal region of the head, above the eye in juveniles at 30 DAH. The spines first appeared in preflexion larvae of *C. naritus* at 7 DAH, covering the ventral skin region below pectoral fin base and expanded to the ventral part of the body and nearly covered the whole abdomen region before the anus and below the eyes in juveniles. *C. naritus* remain as larvae for approximately 29 days, during which they metamorphose to the juvenile stage prior to sexual maturation. Observations in larvae development of *C. naritus* revealed similar characteristics with other Tetraodontidae species.

KEYWORDS

aquaculture, early life history, larvae, morphology, pufferfish, tetraodontidae

1 | INTRODUCTION

Studies on the early life history of fish have been widely utilized and acknowledged as important data not only to understand the biological features of fish species, but also to investigate their breeding ecology and conservation of endangered species (Blaxter, 1974; Mihelakakis, Yoshimatsu, & Tsolkas, 2001; Moore, 1982; Park et al., 2014; Takeshita, Onikura, Matsui, & Kimura, 1997; Yokouchi et al., 2016). Furthermore, information on embryonic and larval development of fish is a fundamental key which enables a closer approach to their biology and taxonomy (Celik, Celik, Cirik, Gurkan, & Hayretdag, 2012).

Concurrently, the morphological features are very important as they furnish information of life history of fish and provide critical parameters to hatchery production in aquaculture (Chen, 2005; Gallego, Yoshida, Kurokawa, Asturiano, & Fraser, 2017; Yang & Yang, 2004). In addition, documentation of embryonic and larval development of