Molecular cloning of the vitellogenin gene in the hard-lipped barb (osteochillus hasseltii c.v) and photoperiodâ€™S effects on gene expression

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Abstrak

Photoperiod affects fish reproduction as it regulates activities of the endocrine glands, which produce the hormones needed for geonadal growth and development, gametogenesis, and reproductive cycles. This study aimed to determine the effects of photoperiod on the hard-lipped barbâ€™s reproductive performance by exposing the fish to three photoperiod treatments (light hour: L, darks hour: D), namely 14L:10D (control), 8L:16D (short photoperiod) and 18L:6D (long photoperiod), with four aquaria, each containing 9 fish, serving as replicates. The fish were kept under these photoperiods for 8 weeks. Liver activity, the observable variable in the study, was evaluated by measuring vitellogenin gene expression. Normalized data were then subjected to ANOVA, followed by Tukeyâ€™s range test. The hard-lipped barbâ€™s vitellogenin cDNA was found have a 1136 bp sequence and the vitellogenin precursors encoded cDNA comprising 378 amino acids. The vitellogenin gene in each experimental group saw a significant increase on average when exposed to longer photoperiods ($P<0.05$), and the highest levels of vitellogenin gene expression occurred under long photoperiods (LP, 18 h light:6 h dark). These results indicate that longer photoperiods stimulate and improve the hard-lipped barbâ€™s reproductive performance.