

UNIVERSITI PUTRA MALAYSIA

EFFECT OF WATER EXCHANGE RATE ON THE GROWTH PERFORMANCE AND SURVIVAL OF KERAI LAMPAM, Hypsibarbus wetmorei x Barbonymus gonionotus

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This project report is submitted in partial fulfillment of the requirements for the degree of Bachelor of Agriculture (Aquaculture)

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ABSTRAK

Kesan kadar pertukaran air terhadap prestasi pertumbuhan dan kelangsungan hidup kerai lampam, Hypsibarbus wetmorei x Barbonymous gonionotus telah dikaji. Kesan pertukaran air pada parameter kualiti air juga telah dikaji. Eksperimen ini telah dijalankan selama dua bulan di Stesen Penyelidikan Akuakultur, Jabatan Akuakultur, Fakulti Pertanian, Universiti Putra Malaysia, Serdang, Selangor. Eksperimen ini melibatkan empat rawatan. Rawatan melibatkan tiada pertukaran air (Rawatan 1), pertukaran air setiap hari (Rawatan 2), pertukaran air mingguan (Rawatan 3) dan pertukaran air sekali dalam dua minggu (Rawatan 4). Setiap rawatan mempunyai empat replikasi. Setiap akuarium diisi dengan 60L air. Semasa pertukaran air, 30% air akuarium telah digantikan dengan air paip yang telah nyahklorin. Anak kerai lampam telah dipenuhi dengan kepadatan 20 ekor/akuarium (333 ekor/m³). Pelet buatan dengan 42% protein telah diberikan sebanyak 5% daripada berat badan ikan. Anak kerai lampam dari sekali dalam dua minggu pertukaran air menunjukkan pertumbuhan lebih tinggi dari segi jumlah berat badan (TWG) $(1.29 \pm 0.15g)$, berat badan harian (DWG) $(0.03 \pm 0.00g)$ dan kadar pertumbuhan spesifik (SGR) (2.55 ± 100) 0.28g) berbanding dengan rawatan lain. Walau bagaimanapun, dari segi kelangsungan hidup, tiada pertukaran air dan pertukaran air harian menunjukkan peratusan tertinggi dengan 93.75%. DO dikekalkan diatas 4mg/L, dengan suhu di antara 25 hingga 27°C dan bacaan pH antara 6.1 – 8.2. Kepekatan TAN sepanjang eksperimen adalah antara 0 hingga 2.63mg/L. Tiada tanda-tanda tekanan ketara kelihatan pada anak kerai lampam sepanjang tempoh kajian. Kekeruhan meningkat di antara 1.29 hingga 90.65NTU sepanjang tempoh eksperimen. Secara keseluruhannya, berdasarkan kepadatan benih dan keadaan semasa eksperimen ini dijalankan, adalah disyorkan bahawa pertukaran air tidak perlu untuk menternak benih kerai lampam bagi mencapai tahap pertumbuhan yang boleh diterima dalam tempoh 6 minggu.

ABSTRACT

The effect of water exchange rate on the growth performance and survival of kerai lampam, Hypsibarbus wetmorei x Barbonymous gonionotus was studied. Effect of water exchange on water quality parameters was also investigated. The experiment was conducted for two months at the Aquaculture Research Station, Department of Aquaculture, Faculty of Agriculture, Universiti Putra Malaysia, Serdang, Selangor. The experiment involved four treatments. The treatments were zero water exchange (Treatment 1), daily water exchange (Treatment 2), weekly water exchange (Treatment 3) and once in two weeks water exchange (Treatment 4). Each treatment had four replicates. Each aquarium was filled with 60L of water. During water exchange, 30% of the aquarium water was replaced with dechlorinated tap water. Kerai lampam fingerlings were stocked at a density of 20 pieces/aquarium (333 fingerlings/m³). Artificial pellets with 42% protein were given at 5% of body weight. Kerai lampam fingerlings cultured in once in two weeks water exchange showed higher total weight gain (TWG) $(1.29\pm0.15g)$, daily weight gain (DWG) $(0.03\pm0.00g)$ and specific growth rate (SGR) $(2.55\pm0.28g)$ compared to other treatments. However, in term of survival, no water exchange and daily water exchange showed the highest percentage of survival with 93.75%. DO was maintained above 4 mg/L, with temperature ranged between 25 to 27°C and pH reading between 6.1 to 8.2. The TAN concentration throughout the experiment ranged between 0 to 2.63mg/L. No noticeable stress symptoms were observed on the fingerlings throughout the experimental period. Turbidity increased as the experiment progressed and ranged from 1.29 to 90.65NTU. Overall, it is recommended that under the studied stocking density and conditions, water exchange is not necessary to nurse kerai lampam fingerlings with acceptable growth for a period of 6 weeks.

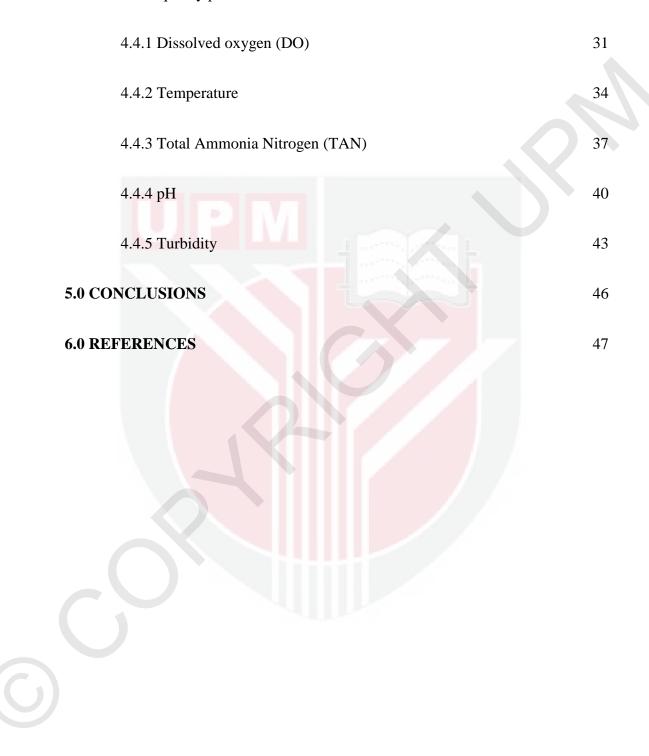
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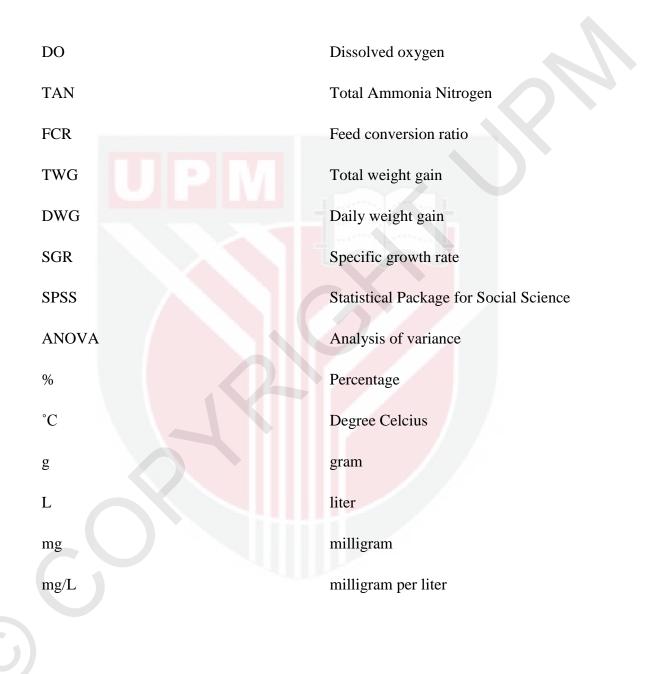
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LIST OF ABBREVIATIONS / SYMBOLS



CHAPTER 1

INTRODUCTION

1.1 Background of study

Kerai lampam is a hybrid fish species that was produced from research conducted since 2004 (Anon., 2004). Kerai lampam is a hybrid of male kerai kunyit (River carp), *Hypsibarbus wetmorei* and female lampam jawa (Silver barb), *Barbonymus gonionotus*. Each parent species have their unique characteristics, morphologically and biologically. For kerai kunyit, the species can be easily identified by the yellowish coloration on their lower abdomen but their growth rate is low. Unlike kerai kunyit, lampam jawa is a species with faster growth rate. The hybridization of both species yielded a new species with attractive appearance and faster growth rate. To date, there are not many studies on kerai lampam.

In Malaysia, kerai lampam species is endemic to Pahang River (Chew & Zulkafli, 2012). Lampam jawa is widely distributed in South East Asia, which include Vietnam, Thailand, Cambodia, Lao, Malaysia, Indonesia and Bangladesh. It

grows well on low protein diets, whether feeding on certain aquatic plants or given supplementary feeding (Bentsen *et al.*, 1996).

According to Rainboth (1996), kerai kunyit was commonly found at mid water to bottom depths of medium-sized streams in forest. Kerai kunyit is not known to migrate, but may move upstream during periods of high water levels. On the other hand, he also stated that, lampam jawa was also commonly found at mid water to bottom depth in rivers, streams, floodplains, and occasionally in reservoirs. He further proposed that lampam jawa preferred standing water habitats instead of flowing waters. Lampam jawa can also survive in shallow, turbid waters and grows to table size in as little as three to four months (Gupta & Rab, 1994).

Water exchange can be both beneficial and detrimental. Too much water exchange may increase labor and water supply cost as well as causing stressful condition to aquatic species cultured due to fluctuation in water parameters. Zero water exchange, on the other hand, may lead to increasing concentrations of nutrients and organic matter in the culture system. Accumulation of toxic waste product such as ammonia will affect the survival of kerai lampam and increase mortality. Thus, the purpose of this research was to study the effect of water exchange rate on growth performance, as well as the survival rate of kerai lampam and also how it could affect water quality of the culture system.

1.2 Objectives

- 1. To investigate the effect of water exchange rate on the growth performance and survival of kerai lampam.
- 2. To determine the effect of water exchange on water quality parameters in kerai lampam culture tanks.



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