





A STUDY ON WASTE EXCRETION OF LIONHEAD GOLDFISH (*Carassius auratus*) FED WITH DIFFERENT FEEDING FREQUENCIES

By  
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**FAKULTI AGROTEKNOLOGI DAN SAINS MAKANAN  
UNIVERSITI MALAYSIA TERENGGANU**

**PENGAKUAN DAN PENGESAHAN LAPORAN  
PROJEK ILMIAH I DAN II**

Adalah ini diakui dan disahkan bahawa laporan ilmiah bertajuk:

Kajian tentang Sisa Buangan Ikan Emas Kepala Singa (*Carassius auratus*) dengan Kekerapan Pemberian Makanan Berbeza

(A Study on Waste Excretion of Lionhead Goldfish (*Carassius auratus*) Fed with Different Feeding Frequencies)

oleh..... Mohd Hakim Bin Molah....., No.Matrik ..... UK12944..... telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan ..... Sains Perikanan dan Akuakultur..... sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains Agroteknologi (Akuakultur)....., Fakulti Agroteknologi dan Sains Makanan, Universiti Malaysia Terengganu.

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## DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged

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## ABSTRACT

The total production of ornamental fish in Malaysia increases by 6.40% from 428 298 151 pieces in 2003 to 455 723 540 pieces in 2004. One of the most popular ornamental fish in Malaysia is Lionhead Goldfish (*Carassius auratus*). Many lovers tend to over-feed their fishes. Too much excess food in an aquarium tank can build up foul water or add to the risk of disease. The study of correlation between feeding frequencies and Lionhead Goldfish waste excretion is crucial in order to avoid a lot of problems and to ensure a flow of interests in keeping goldfish as hobby. The study conducted in order to study the effects of feeding frequencies on waste excretion of Lionhead Goldfish, *C.auratus* besides to determine the most suitable feeding frequencies for *C.auratus* between variables used in the study. The experiment conducted at Freshwater Hatchery of Universiti Malaysia Terengganu for a period of 3 weeks. The fish was stabilized and acclimatized with feeding frequencies of 1 time per day for tank A, 2 times per day for tank B and 3 times per day for tank C for a period of a week. Then, the fish separated to 12 different aquariums and the water samples were collected every 4 hour for 72 hour with continuation of feeding. Water samples collected were analyzed for Total Ammonia Nitrogen (TAN), Nitrite (NO<sub>2</sub>-N), Nitrate (NO<sub>3</sub>-N), Total Nitrogen Feces (TN<sub>feces</sub>) and Total Suspended Solid (TSS). Analysis showed that Treatment A with once a day feeding frequencies gave out significant lower ( $P < 0.05$ ) concentration of ammonia, nitrite and nitrate than Treatment B and C with 2 and 3 times feeding frequencies respectively. TSS of Treatment A is significantly lower than Treatment C and there were no significant different ( $P > 0.05$ ) between treatments on percentage of TN<sub>feces</sub>. Thus, feeding *C.auratus* with once a day feeding frequencies is the best feeding frequencies.



## ABSTRAK

Pengeluaran ikan hiasan di Malaysia meningkat sebanyak 6.40% daripada 428 298 151 ekor pada tahun 2003 kepada 455 723 540 ekor pada tahun 2004. Antara ikan hiasan terkenal di Malaysia ialah Ikan Emas Kepala Singa (*Carassius auratus*). Ramai antara peminat cenderung untuk terlebih memberi makanan kepada ikan hiasan mereka. Makanan yang berlebihan di dalam akuarium akan menyebabkan air berbau dan meningkatkan risiko penyakit. Kajian tentang korelasi antara kekerapan pemberian makanan dan pembuangan sisa ikan emas Kepala Singa adalah penting untuk mengelakkan masalah dan memastikan minat yang berterusan terhadap ikan emas. Kajian dijalankan untuk mengkaji kesan kekerapan pemberian makanan berbeza terhadap hasil perkumuhan *C.auratus* selain menentukan kekerapan pemberian makanan yang paling sesuai terhadap ikan. Kajian dijalankan di hatcheri air tawar Universiti Malaysia Terengganu untuk tempoh masa 3 minggu. Ikan distabilkan dan dibiasakan dengan kekerapan pemberian makanan sebanyak 1 kali sehari bagi tangki A, 2 kali sehari bagi tangki B dan 3 kali sehari bagi tangki C selama seminggu. Kemudian, ikan-ikan diasingkan kepada 12 akuarium yang berbeza dan sampel air dikutip setiap 4 jam selama 72 jam dengan penerusan pemberian makanan pada pukul 6 pagi, 8 petang dan 12 malam. Sampel air dianalisis untuk mengetahui kandungan ammonia (TAN), nitrit ( $\text{NO}_2\text{-N}$ ), nitrat ( $\text{NO}_3\text{-N}$ ), jumlah nitrogen feces ( $\text{TN}_{\text{feces}}$ ) dan jumlah substrate terapung (TSS). Analisa menunjukkan Tangki A dengan kekerapan pemberian makanan sekali sehari memberikan kepekatan yang lebih rendah yang nyata dalam kandungan TAN,  $\text{NO}_2\text{-N}$  dan  $\text{NO}_3\text{-N}$  berbanding Tangki B dan C dengan dua kali sehari dan tiga kali sehari pemberian makanan. Tangki B dan C tidak mempunyai perbezaan yang nyata dalam semua parameter yang dikaji. TSS untuk Tangki A nyata lebih rendah berbanding Tangki B dan C manakala  $\text{TN}_{\text{feces}}$  tidak mempunyai perbezaan nyata antara ketiga-tiga tangki. Maka, pemberian makanan sekali sehari adalah kekerapan pemberian makanan yang terbaik.