STRESS RESPONSES OF RED NILE TILAPIA (*Oreochromis niloticus*) TO DIFFERENT ENVIRONMENTAL COLORS

by

FRANC JACOB LAURETA SABACAN

An Undergraduate Thesis presented to the faculty of the College of Fisheries in partial fulfillment of the requirements for the degree of

BACHELOR OF SCIENCE IN FISHERIES

Department of Aquaculture
COLLEGE OF FISHERIES
CENTRAL LUZON STATE UNIVERSITY
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FRANC JACOB LAURETA SABACAN

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STRESS RESPONSES OF RED NILE TILAPIA (*Oreochromis niloticus*) TO DIFFERENT ENVIRONMENTAL COLORS

ABSTRACT

This study aimed to evaluate the effects of different environmental colors, such as transparent/white (T1), blue (T2), red (T3) and yellow (T4), to the stress responses of red Nile tilapia (*Oreochromis niloticus*) mainy, eye color pattern (ECP), ventilation rate (VR) and skin color. Aquaria were covered with specific color of cellophane, and each was supplied with an illumination with the same color as the cellophane. The bulb was turned-on two hours per day. Twelve (12) fish were randomly distributed one in each aquarium, and were fed once per day at 1% of their body weight.

Means of the ECP of fish in each treatment before and after the 2-hour artificial illumination were not significantly different ($P>0.05$) from each other. Before exposure to artificial light, mean ECP value of 1.13±1.25 was observed in T3 followed by T1 (0.46±10.80) and T2 (0.12±0.19). No eye darkening was observed in T4 (0.00±0.00). After exposure to artificial illumination, increase in mean ECP was observed in T2, T3 and T4. However, mean ECP value in T1 decreased. Mean ECP value of 1.40±1.25 was observed in T3, followed by T1 (0.43±0.72), T2 (0.19±0.29, and lastly T4 (0.015±0.02))

Significant difference was observed in the mean VR values among treatments before exposure to artificial illumination. T4 obtained the lowest mean VR value of 1.38±0.05 beats/sec, which was significantly different from those of the rest of the treatments. T1 obtained a 1.54±0.12 beats/sec mean VR value, not significantly different from that of T2 (1.57±0.08 beats/sec). T3 obtained the highest mean VR value of 1.71±0.04 beats/sec, which not significantly different from that of T2. Mean VR values of T1, T2 and T3 were not significantly different from each other. Means of VR from all treatments have increased significantly after application of artificial light.

Lowest skin color change value (paler) was observed in T1 (-2.33±0.58), but not significantly different from those of T4 (-1.67±0.58) and T2 (0.33±2.52). T3 obtained the highest skin color change value (darker) of 1.67±1.15, which is comparable to that of T2.

There was a significant and strong positive relationship observed between the means of ECP and VR before ($n=12$; $r=0.521$; $P<0.05$) and after ($n=12$; $r=0.561$; $P<0.05$) exposure of fish to artificial light and during exposure to different environmental colors.

In conclusion: (1) different environmental colors significantly affected the stress responses (ECP, VR and skin color) of red Nile tilapia. There were greater stress responses (e. g. changes in ECP, VR and skin darkening) in fish held at red environment/light. A yellow environment/light gave a positive effect on the overall welfare of red Nile tilapia, comparable to that of its natural environment (white). Contradictory to what has been hypothesized, blue environment/light was not optimum for red Nile tilapia; (2) There was a significant and strong positive relationship between ECP and VR.

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