STRESS RESPONSE OF RED TILAPIA (*Oreochromis* sp.) AS AFFECTED BY DIFFERENT STOCKING DENSITIES

by

MARIA FE ODULLO PARAMBITA

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
Science City of Muñoz, Nueva Ecija
Philippines

2017

CF Thesis Form No. 8

COLLEGE OF FISHERIES
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ACKNOWLEDGMENTS

The thesis conducted by the author at the Wet Laboratory, Freshwater Aquaculture Center (FAC), College of Fisheries (CF) will not be possible and successful without the people, who contributed directly and indirectly to the accomplishment of this paper. Thus, they deserve appreciation and acknowledgment.

First, she gives credit to Dr. Emmanuel M. Vera Cruz, the authors' adviser and also the Director of the Freshwater Aquaculture Center, for his patience, guidance and assistance, to the author starting from the thesis proposal, thesis conduct until the writing of the manuscript. His encouragements motivate the author to continue this experiment. Sir, thank you very much, may you continue to inspire and at the same time a blessing to others.

To the author's critic, Ms. Claire Samantha T. Juanico for the patience, comments and suggestions which helped a lot on the improvement of this manuscript.

To the College Research Coordinator, Dr. Remedios B. Bolivar, for her support, patience, assistance and suggestions.Thank you so much, Ma'am.

To all the great professors and mentors of the College of Fisheries: Prof. Janet O. Saturno, Prof. Rodora M. Bartolome, Dr. Karl Marx A. Quiazon, Dr. Apolinario V. Yambot, Dr. Jose S. Abucay, Dr. Ravelina R. Velasco, Dr. Alvin T. Reyes, Ms. Lorenz J. Fajardo, Ms. Rea Mae C. Templonuevo, for their teachings, wisdom and opinions provided, which were helpful and useful to the author's voyage in life.

To the staff of College of Fisheries and Freshwater Aquaculture Center (FAC): Engr. Zaldy Bartolome and his co-workers, for their assistance in providing manpower and materials needed for the conduct of the study.

To the Bureau of Fisheries and Aquatic Resources for the financial support.

She would like also to express her thanks to Mrs. Julieta Holasca and Mr. Ruel Gabales for their patience in helping and teaching the author on how to use and avail the resources in the Wet Laboratory of FAC and for their guidance throughout the conduct of the experiment.

To all the author's classmates, Daniel and Xhy for helping the author in the statistical analysis, and the former for his words of wisdom and encouragement given to the author. To Jerome for being always there when the author needs a companion, and for his shared talks, laughter's and even foods, which serves as a stress reliever to the author. To Laura, Samuel, Cedes, Fatima, Yumi and Jewel for their help and support during the conduct of the experiment; for the author could not accomplish everything without them. To Noriel for letting the author borrow his digital camera for the documentation of the experiment.

To Reymark Padernos for his comfort, motivation, support given to the author especially in times of loneliness and stressful times.

To the author's family: Nana, Ate Jean, Ate Ivy, Mana Rose, and Papa for their continuous moral, spiritual and financial support, a bunch of thank you is extended to all of you.

Above all, to Almighty God for without Him, everything would not be possible and also for his continuous guidance and blessings throughout her college life journey. The highest appreciation and acknowledgment is due Him.

MARIA FE O. PARAMBITA

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDIX TABLES

STRESS RESPONSE OF RED TILAPIA (*Oreochromis* sp.) AS AFFECTED BY DIFFERENT STOCKINGDENSITIES[1/]

ABSTRACT

This study aimed to evaluate the effects of different stocking densities on the stress responses of red tilapia (*Oreochromis* sp.) when exposed to physical stressor. The physical stressor applied was the chasing net applied for 60 seconds. There were four treatments namely, T1 (control) with a single fish, T2 - the 3-fish group, T3 - 6-fish group, and T4 - 10-fish group. T2, T3 and T4 were applied with the chasing net or the physical stressor. The effects were identified through the stress indicators namely, eye color pattern(ECP) and ventilation rate (VR).

Mean ECP values in the four treatments during the entire duration of the study were significantly different ($P<0.05$) from each other. T3 (4.26±0.51) had the significantly highest ECP value among the four treatments, this was followed by T4 (3.48±0.72), T2 (3.31±0.48) and T1 (2.41±0.35) had the significantly lowest ECP value.

Comparison of the mean VR values during the entire observation period showed that they were significantly different from one another. The significantly highest mean was observed on the T4 (2.10±0.41 beats/sec), followed by T3 (1.99±0.51 beats/sec), then T1 and T2, with the values 1.90±0.55 and 1.64±0.74, respectively.

There was an increase in the mean ECP values in T4 right after the application of the stressor with the value 3.33±1.14 to 3.50±0.25 in comparison to other treatments (T2 and T3) with reduced ECP values. However, no significant difference was observed in all the treatments in the ECP values right after the application of the stressor. The VR values of all the treatments (T2, T3 and T4) applied with the stressor increased right after the application of the stressor (0 mins).

T2 (3-fish group) had the highest mortality rate of 44.44% compared to the other treatments. It was followed by T4 (10-fish group), then T3 (6-fish group), with 33.33% and 27.78%, respectively. The highest fish mortality may be attributed to the high occurrence of social dominance, in the 3-fish group, unlike in the 6-fish group and the 10-fish group, wherein the number of organisms in the experimental unit only slightly affected the occurrence of social dominance.

Positive correlation was observed between the mean VR and mean ECP (r =0.023; $P>0.05$; n =44) although the relationship was not significant. This indicates that fish which has a paler ECP value generally has a lower VR values also.

In conclusion: (1) there are greater stress responses (i.e. changes in ECP and VR) in fish held at high stocking density when they are exposed to physical stressor; (2) there is higher mortality rate at lower stocking density because of the effect of density on social interaction and the establishment of social hierarchy; and 3), there is a positive but not significant relationship between ECP and VR but ECP is a more reliable stress indicator than VR under this stressful condition. Thus, ECP could be used as effective, easy and inexpensive stress indicators.

[1/]Undergraduate thesis presented to the faculty of the College of Fisheries, Central Luzon State University as a partial fulfillment of the requirements in the degree of Bachelor of Science in Fisheries. Prepared at the Department of Aquaculture under the supervision of Dr. Emmanuel M. Vera Cruz.

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