FISHERY CHARACTERISTICS AND POPULATION GENETIC STRUCTURE OF *LETHRINUS LENTJAN* IN SELECTED FISHING AREAS ALONG THE KENYA COAST

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DECLARATION

This thesis is my original work and has not been submitted for a degree in any other university or any other award.

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We confirm that the candidate carried out this thesis research work under our supervision and guidance.

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DEDICATION

I dedicate this thesis to my family for their endless support and perseverance in furthering my studies. I also dedicate this thesis to my friends for their continued encouragement. My heartfelt gratitude to my family especially my parents for their encouragement and support when I was in doubt and despair during this journey. To my dear friends who have been with me through thick and thin during this journey, held my hands, and gave me encouraging words and hope to finish my thesis.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AMOVA	-	Analysis of Molecular Variance
ELEFAN	-	Extended Electronic Length Frequency Analysis
CA	-	Cohort Analysis
CTAB	-	Cetyl-trimethyl Ammonium Bromide
IBD	-	Isolation by Distance
LFA	-	Length Frequency Analysis
NEM	-	Northeast Monsoon
PCR	-	Polymerase Chain Reaction
PLD	-	Pelagic Larvae Duration
SEM	-	Southeast Monsoon
SWIO	-	South West Indian Ocean

ABSTRACT

The species *Lethrinus lentjan* (pink-ear emperor) is commercially important and primarily distributed in the western region of the Indo-Pacific Ocean. This species contributes a significant portion of the artisanal landings, making it one of the dominant species along the Kenya coast. This species is, however, reported to be overexploited. Data on *L. lentjan* for the stock status of its artisanal fishery and genetic diversity is still inadequate along the coast of Kenya. Therefore, the study's focus was to evaluate the recent stock status as well as population genetic differentiation for this species in selected fishing areas along the coast of Kenya to provide management recommendations. Monthly shore-based catch assessments for fisheries and biological data were collected for 11 months (October 2020 to September 2021). Fin clips for genetic analysis were obtained from the caudal fin and stored in 100% ethanol prior to DNA extraction. The CTAB approach was used for genomic DNA extraction using ethanol-preserved samples. These samples were inspected for purity and quantity and stored at -20^{o}C before sequencing. Polymerase chain reaction (PCR) and sequencing of the CO1 gene were performed using universal primers for marine fishes. A total of 22 lethrinid species were recorded over the study period. Msambweni had the highest lethrinid artisanal landings, accounting for more than 69%, while *L. lentjan* contributed 25% of the total landings. Female individuals of *L. lentjan* were more abundant than males, with an overall sex ratio 1:1.53, and this differed significantly from the expected ratio of 1:1. *Lethrinus lentjan* recorded a negative allometric growth with an asymptotic length (L_{∞}) and growth coefficient (K) of 51 cm and 0.46y^{-1}, respectively. The mortality

coefficients Z, M, and F were 2.07, 0.963, and 1.10, respectively, with an exploitation rate of 0.53. The recorded E value of 0.53, in this study, was slightly higher than the optimum exploitation rate E = 0.5, indicating this species was slightly overexploited. The absence of genetic differentiation between sites indicates *L. lentjan* comes from a single genetic population, and the management strategy of this fishery needs to be interpreted carefully along the Kenya coast.