

**Ecology and Molecular Characterization of Snail Intermediate Hosts of Schistosomiasis in
the Endemic Area of Ibadan, Southwestern, Nigeria**

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**Being a Thesis Submitted to the Department of Biological Sciences, Faculty of Natural and
Applied Sciences, Lead City University, Ibadan, Oyo State, Nigeria**

**In Partial Fulfillment of the Requirements for the Award of Masters Degree (M.Sc.) in
Parasitology**

Certification

This is to certify that this Project was written by Azeez KOLAWOLE with Matric Number LCU/PG/006297 has been read and approved as part of fulfillments for the award of Masters in Biology (Parasitology) of Lead City University, Ibadan, Nigeria.

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Dedication

I sincerely dedicate this project to Almighty Allah for supporting and sustaining me through this work, I am indeed grateful.

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Acknowledgement

My ever cherished gratitude goes to the Almighty God for His grace and sparing my life up to this moment. I want to appreciate the Management of Lead City University, Ibadan for providing enabling opportunity for learning. Also want to acknowledge the efforts of my amiable supervisor Dr. Adegbehingbe, K.O for his thoroughness and patience to ensure the realization of this research project work. I will like to appreciate my parents and my wife, Kolawole Sarafat Omoniyi for prayers, spiritual and financial supports, may God continue to protect you and spare your life to reap the fruit of your labour

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Abstract

Freshwater snails are critical intermediate hosts for schistosomes, the parasitic trematodes of schistosomiasis. This study investigated the ecology, infection prevalence, and molecular identification of snail vectors in three rivers within Ibadan, Oyo State, Nigeria, a known schistosomiasis-endemic region. This study was conducted in nine-month period covering both dry and wet seasons, 2,284 snails were collected and identified. *Bulinus globosus* was the most abundant species (41.8%, n=956), followed by *Biomphalaria pfeifferi* (22.2%, n=509), *Melanoides tuberculata* (18.6%, n=425), and *Physa acuta*. (17.2%, n=395). A key finding was the strikingly high prevalence of schistosome infection in the primary vector species. Among *B. globosus*, 26.8% (256/956) were shedding cercariae, with a mean intensity of 1.19. For *B. pfeifferi*, 16.5% (84/509) were infected, with a mean intensity of 1.21. *Melanoides tuberculata* showed no infection (0%), but the highest mean intensity of 2.08 cercariae per infected snail. Snail abundance exhibited strong seasonal variation, with significantly higher densities recorded in the dry season (n=1,282) compared to the wet season (n=938), attributed to habitat concentration and stability. Water physicochemical analysis revealed that several parameters, including pH, chloride concentration, Biochemical Oxygen Demand (BOD), and Chemical Oxygen Demand (COD), were negatively correlated with snail diversity and richness, highlighting the role of environmental factors in shaping vector populations. Molecular characterization using mitochondrial COI and 16S rRNA gene sequencing confirmed the identity of key species, including *B. globosus* and *B. pfeifferi*, with 99-100% identity matches on NCBI BLAST. This molecular validation is crucial for accurate vector surveillance. The study therefore emphasize high-risk transmission hotspots for both urogenital and intestinal schistosomiasis, driven by the high abundance and infection rates of *B. globosus* and *B. pfeifferi*. These findings underscore the urgent need for integrated, seasonally-tailored control strategies combining mollusciciding, environmental management, improved sanitation, and community education to disrupt transmission and reduce the schistosomiasis burden in these communities.

Word count: 298 words

Keywords: Freshwater snails, Schistosomiasis, physico-chemical, Cercariae, Molecular

Table of Contents

Content	Page
Title page	i
Certification	ii
Dedication	iii
Acknowledgement	iv
Abstract	v
Table of Contents	vi
List of Tables	viii
List of Figures	ix
List of Plates	x
Chapter One: Introduction	1
1.1 Introduction	1
Chapter One: Introduction	1
1.1. Background to the study	1
1.2 Statement of the Problem	5
1.3 Justification of the study	6
1.4 Aim and Objectives of the Study	7
1.5 Research Questions	8

1.6 Research hypothesis	9
1.7 Scope and Limitation of the Study	9
1.8. Significance of the Study	10
1.9. Operational terms	10
Endnotes	12
Chapter Two :Literature Review	14
2.1 Conceptual Review	14
2.2 Epidemiology of Schistosomiasis	15
2.3 Global Disease Burden of Schistosomiasis	17
2.4 Epidemiology of Schistosomiasis in Nigeria	19
2.5 Freshwater snail intermediates Hosts of Schistosomiasis	20
2.6.Ecology of Freshwater Snails	23
2.7 Global Prevalence of Schistosomiasis	24
2.8 Distribution of vector snails	25
2.9.1Abiotic Factors	27
2.9.1.1. Physical Factors	27
2.10 Snail Intermediate Hosts of Human Schistosomes	28

2.11 Taxonomy of freshwater vector snails in Nigeria	29
2.12 Prevalence of Schistosomiasis in Africa	30
2.13 Morbidity and Mortality of Schistosomiasis	35
2.14 Schistosomiasis Diagnosis	37
2.15 Prevention and Control of Schistosomiasis	39
2.16 Control of Schistosomiasis	40
2.17 Elimination of Schistosomiasis	41
2. 18 Physico-chemical factors of water affecting snail distribution	42
2.18.1 Rainfall	43
2.18.2 Temperature	45
2.18.3 Dissolved Oxygen Concentration	46
2.18.4 Hydrogen –Ion Concentration	46
2.18.5 Total Dissolved Solids	46
2.18.6 Salinity	46
2.19 Biology of snail Intermediate Host	47
2.19.1 Characteristics of the freshwater vector snails and their habitats	49
2.19.1.1. <i>Lymnea natalensis</i> (Krauss, 1848)	50

2.19.1.2 <i>Bulinus senegalensis</i> (Muller, 1781)	50
2.19.1.3. <i>Biomphalaria pfeifferi</i> (Krauss , 1848)	51
2.11.5 <i>Bulinus globosus</i> (Morelet, 1866)	52
2.1i.1.4 <i>Lanistes libicus</i> (Morelet 1848)	52
2.19.6 <i>Melanoides tuberculata</i> (Muller, 1774)	53
2.19.7 <i>Potadoma moerchii</i> (Reeves 1859)	53
2.19.8 <i>Physa acuta</i>	54
Endnotes	55
Chapter Three : Materials and Methods	67
3.1 Study Area	67
3.2 Measurement of Physicochemical Parameters of Water Samples	69
3.2.1 Dissolved oxygen (DO)	69
3.2.2.Turbidity	70
3.2.3 Nitrate	70
3.2.4 Temperature	71
3.2.5 Conductivity	71
3.2.6. Total dissolved solid (TDS)	71
3.2.7 Nitrite	72

3.3 Protocol for the collection of snails sampling	72
3.4 Release Pattern and identification of cercariae	72
3.5 Mean Intensity	73
3.6 Genomic DNA extraction from snails	74
3.7 Molecular Screening of Snails for Schistosomiasis	74
3.8 Molecular identification of snails	75
3.9 Data Analysis	75
Endnotes	77
Chapter Four : Results and Discussion of Findings	78
4.1 Results and Discussion	78
4.2 Discussion of Findings	115
4.3 Molecular Characterization of freshwater snails	125
Endnotes	127
Chapter Five : Conclusion	130
Summary, Conclusion and Recommendation	131
5.1 Summary	132
5.2 Conclusion	132
5.3 Recommendation	132
5.4 Suggestion for Further Studies	133

5.5 Contribution to Knowledge	133
Bibliography	134
Bio- data	143
University Compliance Certification	149

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List of Tables

Content	Page
Table 4.1: Mean intensity of cercariae shed by snail intermediate hosts	84
Table 4.2: Number of snails shedding cercariae	90
Table 4.3: Seasonal Occurrence and Abundance of Freshwater Snail Species Collected in the Study 2024-2025	95
Table 4.4 seasonal occurrence and abundance	99
Table 4.5: Median and Range values of the physico- chemical characteristics of water collected from eight sites (L1-L8) in the study Area	114
Table 4.6: rrnL-nad1 Primer sequences	118
Table 4.7: Sequence Prediction Report	120

List of Figures

Content	Page
Figure 1: A map showing selected rivers for snail sampling	68
Figure 2: Occurrence of vector snails in the study Area	80
Figure 3; Sample freshwater snails	107
Figure 4: A photographic image of an agarose gel indicating the amplification of the COI target region	124

List of Plates

Content	Page
Plate 1: Snail samples belonging to the genus <i>Bulinus</i> collected from the study area	108
Plate 2; showing snails in the field sampling	109
Plate 3; Showing snail from Eleyele rivers	110
Plate 4; Showing snails from Adeyi river	111
Plate 5; Showing <i>Biomphalaria</i> species	112
Plate 6: Trematode cercaria shed by <i>Biomphalaria</i> snails on a slide view of $\times 100$ magnification	113

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