

**IDENTIFICATION AND CHARACTERIZATION OF
FRESHWATER ALGAE IN THE EASTERN PROVINCE**

SRI LANKA.



By

W A N Udayanga



FTC242

**Project Report
Main Library, Eastern University, Sri Lanka**

Department of Biosystem Technology, Faculty of Technology

Eastern University, Sri Lanka

2025

ABSTRACT

Freshwater algae are essential components of aquatic ecosystems, providing primary production, nutrient cycling, and water quality maintenance. Nevertheless, their diversity and ecological importance in Sri Lankan freshwater habitats are not adequately investigated. The present research centers on the identification and characterization of freshwater algae from the Eastern Province of Sri Lanka with the goal of filling the knowledge gap in algal taxonomy and distribution. The samples were gathered from different sources of freshwater such as rivers, lakes, and reservoirs with the help of regular sampling procedures. Morphological and microscopic studies were performed for identifying and grouping the algae based on their structure. Environmental parameters like pH, temperature, and nutrient levels were also quantified to determine their effect on the distribution of algae.

A total of 25 freshwater algal species were found, belonging to major taxonomic groups of Chlorophyta, Bacillariophyta, Cyanophyta, and Euglenophyta. Chlorophyta was the most dominant, followed by Bacillariophyta, indicating favorable environmental conditions for green algae growth. The study established a strong correlation between the algal diversity and water quality parameters, enhancing the prospects of certain species as bioindicators of aquatic ecosystem health. Some species had the potential for bloom formation, which could be of relevance in the management of water resources.

Findings of this study would be immensely useful to understand diversity and ecological function of freshwater algae in the Eastern Province of Sri Lanka. It would also serve as a baseline for ecological survey, conservation, and sustainable utilization of water resources in the future in the province. Future studies using molecular methods are recommended for species identification, functional roles in freshwater ecosystems, and their maintenance.

Keywords: inextricably, phototrophic, instantaneous, emphasized,

TABLE OF CONTENTS

DECLARATION	I
ACKNOWLEDGEMENT.....	III
ABSTRACT	IV
TABLE OF CONTENTS	V
LIST OF FIGURES.....	VIII
LIST OF TABLES.....	X
ABBREVIATIONS OF SYMBOLS.....	XII
CHAPTER 01	1
INTRODUCTION	1
1.1 Background.....	1
1.2 Objectives.....	3
1.3 Study Site	4
CHAPTER 02	5
LITERATURE REVIEW.....	5
2.1 Freshwater Algae	5
2.1.1 Microalgae.....	6
2.1.2 Macroalgae.....	6
2.1.3 Freshwater Planktonic and Filamentous Algae.....	7
2.2 Freshwater Algae Species.....	8

2.2.1 Diatoms (Bacillariophyta)	8
2.2.2 Cyanobacteria (Blue-Green Algae).....	9
2.2.3 Green Algae (Chlorophyta)	11
2.2.4 Red Algae (Rhodophyta).....	12
2.3 Samples Collection and Techniques for Freshwater Algae	14
2.3.1 Sample Collection Methods.....	14
2.4 Characterization of Freshwater Algae.....	16
2.4.1. Morphology	16
2.4.2. Physiology	16
2.4.3. Biochemical Composition	17
2.5 Freshwater Algae classification	18
2.5.1. Color	19
2.5.2. Cell Wall Type.....	19
2.5.3. Storage Products	20
2.5.4. Reproduction Method.....	21
2.6 Identification Methods of Freshwater Algae	22
2.6.1 Macroscopic Identification (Visual Observation)	22
2.6.2 Microscopic Identification.....	23
2.6.3 Molecular Techniques	23
2.6.4 Culture-Based Identification.....	24
2.7 Algae Diversity of world.....	25
2.8 Research topic Justification	26
CHAPTER 03	27
METHODOLOGY	27
3.1 Description of Study Site.....	27
3.2 Microscopic Identification	30
CHAPTER 04	31

RESULTS & DISCUSSION	31
4.1 Physiochemical Parameters Recorded	32
4.2 Algal Species Identified	34
DISCUSSION	59
CONCLUSION	62
REFERENCES	63