RELATIONSHIP BETWEEN PLANT SPECIES RICHNESS AND ABOVEGROUND BIOMASS IN GUNDE AND MAIDI LAKE OF POKHARA VALLEY, KASKI, NEPAL

A Dissertation Submitted

For the Partial Fulfillment of the Requirements for the Master of Science in Botany

Submitted By

Dinesh Thapa

M. Sc. Botany (Ecology Special)

Exam Roll No. : 578/1103 (2061/62)

T.U. Regd. No. : 5-1-33-409-97

Central Department of Botany

Tribhuvan University

Kirtipur, Kathmandu, Nepal

2008

CERTIFICATE

This is to certify that the dissertation work entitled "**Relationship between plant species richness and aboveground biomass in Gunde and Maidi lake of Pokhara valley, Kaski, Nepal**" has been carried out by **Mr. Dinesh Thapa** under my supervision. The result of this research work has not been submitted for any academic degree to the best of my knowledge. I recommend his thesis for partial fulfillment of his Master's Degree in Botany, Tribhuvan University.

_____

Mr. Bharat Babu Shrestha
(Lecturer)
Central Department of Botany
Tribhuvan University
Kathmandu, Nepal

Date: November 29, 2008

LETTER OF APPROVAL

This dissertation paper submitted by **Mr. Dinesh Thapa** entitled "**Relationship between plant species richness and aboveground biomass in Gunde and Maidi lake of Pokhara valley, Kaski, Nepal** " has been accepted as a partial fulfillment of Master of Science in Botany.

Expert Committee

.....

(**Supervisor)**

Mr. Bharat Babu Shrestha

Central Department of Botany

T.U., Kirtipur, Nepal

.....

(External Examiner)

Dr. Khem Raj Bhattarai

Ministry of Forest and soil

Conservation (MOFSC)

Singhdurbar, Kathmandu

.....

(Internal Examiner)

Dr. Mohan Siwakoti

Central Department of Botany

T.U., Kirtipur, Nepal

.....

(Head of the Department)

Prof. Dr. Krishna Kumar Shrestha

Central Department of Botany

T.U., Kirtipur, Nepal

Date : November 29, 2008

ACKNOWLEDGEMENT

I am deeply indebted to my respected supervisor Mr. Bharat Babu Shrestha, Lecturer of Central Department of Botany, Tribhuvan University, for his constructive suggestions, guidance and appropriate supervision throughout this dissertation.

I would like to express my sincere gratitude towards Prof. Dr. Krishna Kumar Shrestha, Head, Central Department of Botany and Prof. Dr. Pramad Kumar Jha, former Head, Central Department of Botany for providing laboratory facilities along with constant encouragements. I am highly obliged to Mrs. Anjana Devkota and Prof. Dr. Hari Dutta Lekhak for continuous encouragement and assistance throughout the research work.

I express my sincere gratitude to Dr. TB Gurung, Head, Fisheries Research centre, Gadawari, Lalitpur for his valuable suggestion and kind cooperation.

I would like to acknowledge Mr. Manaharka Adhikari, Lawyer, Lekhnath Municipality, Pokhara and my respected senior colleague, Narayan Pd. Ghimire for their valuable suggestions. I am thankful to Dr. Mohan Siwakoti, Associate Prof. Central Department of Botany and staffs of National Herbarium and plant laboratory, Godawari for helping me in plant identification.

I am thankful to Cornell Nepal Study Program (CNSP) for providing me financial support for this research work. I would like to take this opportunity to acknowledge all the teaching and non-teaching staff of Central Department of Botany for their kind cooperation during laboratory and other works.

I express my heartfelt thanks to my colleague Devendra Kunwar who has been instrumental and phenomenal during my field study. Similarly, I would like to remember my colleagues, Bishnu Baral, Deepak Mahat, Bimal Kunwar, Sharmila Ghale, Bikash Maharjan and Rakesh Shrestha for their warm affection, cooperation and encouragement throughout the research work.

I would like to thank Mr. Ram Krishna Maharjan (RPM Computer Centre, Kirtipur) for computer typing and printing my final manuscripts.

Last but not least, I deeply appreciate the sacrifice made by my parents to bring me up this stage and guide in right direction.

Date : Dinesh Thapa

ABSTRACT

The present study was carried out in two subtropical wetlands, namely Gunde and Maidi lakes wetland of Pokhara valley from an ecological and socio-economic perspectives. Biomass estimation of plant species was done by harvest method and species composition by quadrat method. Altogether 27 species representing 13 families and 26 genera were recorded along with 15 species from Gunde and 23 species from Maidi lake having 12 species common to both lake. Among them, *Elechoris palustris*, *Phragmites* sp. *Leersia hexandra* followed by *Rotala rotundifolia* were dominant species. The highest species richness recorded 10 species/m^2 in Maidi, slightly higher than Gunde, i.e. 9 species/m^2. The species richness recorded was ranged from 3-9 species/m^2 in Gunde and 2-10 species/m^2 in Maidi lake and biomass was 54.09-295.04g/m^2 and 71.10-363.34g/m^2 respectively. A weakly hump-shaped pattern was observed between biomass and species richness. Maximum species richness was found in biomass interval between ca. 100-120g/m^2 when all data were combined.

The background information about socio-economic condition of both lakes reflect partial dependency of people on wetland resources and increasing awareness towards contemporary issues. Principle threats to the lake include: siltation, eutrophication, agricultural runoff and lake area encroachments. Suggested management approaches include integrated land use planning, shoreline campaigning awareness among local people, demarcation of lake boundary and conservation through wise use of available resources.

Key words: siltation, conservation eutrophication species composition socio-economy

LIST OF ABBREVIATIONS AND ACRONYMS

asl	–	Above sea level
CBS	–	Central Bureau of Statistics
d.f.	–	Degree of Freedom
DOAD	–	Department of Agriculture Development
ECOS	–	Ecological Society
HMG/N	–	His Majesty Government of Nepal
IAS	–	Alien Invasive Species
INGOs	–	International Non-Government Organization(s)
IUCN	–	The World Conservation Union
KATH	–	National Herbarium, Department of Plant Resource
LI-BRD	–	Local Initiatives for Biodiversity, Research and Development
MOPE	–	Ministry of Population and Environment
NARC	–	National Agriculture Research Centre
NAS	–	National Academy of Science
NBS	–	Nepal Biodiversity Strategy
NGOs	–	Non-Government Organization(s)
OC	–	Organic Carbon
OM	–	Organic Matter
PER	–	Potential Evapotranspiration Rate
PRA	–	Participatory Rural Appraisal
S.D.	–	Standard Deviation
SORUP	–	Society of Rural Urban Partnership
SPSS	–	Statistical Package for Social Science
SRPR	–	Species Richness-Productivity Relationship
TU	–	Tribhuvan University
TUCH	–	Tribhuvan University Central Herbarium
VDC	–	Village Development Committee
WWF	–	World Wildlife Fund

CONTENTS