

ACKNOWLEDGEMENT

At the onset, it is my privilege to express deep sense of gratitude and indebtedness to my Supervisor of the present research work, Dr. Sudip Barat, Professor, Department of Zoology, University of North Bengal for his unequivocal motivation, benevolent guidance, affectionate encouragement and constant supervision during the entire period of the investigation and preparation of manuscript and thesis writing. He always encouraged me to work on various aspects of Aquaculture and share developing new ideas in the research field. He always welcomed me to any problem on Aquaculture and Limnology based research work.

I wish to express my deep sense of gratitude and indebtedness to my Co-Supervisor Dr. (Mrs.) Debapriya Sarkar, Professor in Fishery Unit, Uttar Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, West Bengal, for her valuable guidance during the period of research. She always encouraged me in my research work so that I could reach the research goal.

It is also my pleasure to express heartiest gratitude to Prof. Somnath Ghosh, Honourable Vice-Chancellor, University of North Bengal; Dr. Laxmikanta Padhi, Registrar, Dean and other officials of the University for extending academic and administrative facilities to me.

It is also a glorifying pleasure for me to express my thanks to Dr. Chirantan Chattopadhyaya, Honourable Vice-Chancellor, Uttar Banga Krishi Viswavidyalaya for their useful suggestion and cooperation.

My deep sense of gratitude is extended to my respected teacher Prof. Apurba Kumar Chowdhury, Plant Pathology, Uttar Banga Krishi Viswavidyalaya for necessary academic facilities.

It is my great pleasure to express my sincere thanks to Dr. Min Bahadur, Head, Department of Zoology, University of North Bengal. My Ph.D. thesis would never have been completed without his help. Whenever I faced any problem regarding my research work, I used to seek his advice and he always gave me good suggestions.

I sincerely express my thanks to the respected Faculty Members Prof. Joydeb Pal, Prof. Ananda Mukhopadhyaya, Prof. Tapas Kumar Chaudhuri, Prof. Soumen Bhattacharjee, Dr. Dhiraj Saha and Mr. Tilak Saha, Department of Zoology, University of North Bengal for their constant encouragement, cooperation and helpful suggestions.

I am grateful to Mr. Kripan Sarkar, owner of the Rainbow Ornamental Fish Farm, Raninagar, Jalpaiguri, West Bengal. He was my practical teacher in the field of ornamental fish breeding and culture. I extend my thanks to his wife also Mrs. Anna Sarkar, for helping me in the research work especially during the night in the field laboratory to monitor the breeding programme.

I would like to offer my thanks to the Dr J. K. Jena, DDG (Fisheries Science), Indian Council of Agricultural Research (ICAR), New Delhi, for providing the necessary facilities and suggestions. I am thankful to Dr. Mahender Singh, Principal Scientist, Molecular Biology and Biotechnology Division, National Bureau of Fish Genetic Resources, Lucknow, Uttar Pradesh, India for extending permission to use the vast laboratory facilities with regard to DNA barcoding of my experimental fishes.

I deem it a unique opportunity and express my profound sense of gratitude and ingenuous regards to Dr. Niloy Ray from Hoogly Mohsin College, Chinsura, West Bengal, Mr. Uday Udit from CIFA, Bhubaneswar, Odisha, India, Mr. Debdut Debnath, Mr. Sukanto Debnath and Mr. Subhojit Chakraborty for their support and encouragement.

I want to express my heartiest thanks to Mr. Archisman Barat, a Ph.D. research Scholar, Central University of South Bihar, Patna for extending his unique idea on my research and related topics. I sincerely express my thanks to Mr. Prasun Mazumder and Mr. Shibnath Sarkar for helping me in my computational work.

The completion of my thesis is also due to the whole hearted support of my senior research colleague Ms. Ruksa Nur. I am also happy to express my thanks to other senior colleagues Dr. Prithwiraj Jha, Dr. Manik Lal Acharjee, Dr. Soma Banerjee, Dr. Rudra Prasad Roy, Mr. Rakesh Prasad Bhagat and friend Sanjib Sarkar.

I am thankful to my senior colleagues Tanmay Mukhopadhyay, Kumar Basnet, Anjali Prasad, Somit Dutta, Sutanuka Chattaraj, Uttara Dey Bhoumick, Tanmoy Dutta,

Bappaditya Ghosh and Swati Singh for their suggestions time to time. My thanks is extended to my friend Subhashis Paul and Ms Ankita Mukherjee.

I would like to express a word of thanks to the Librarian, University of North Bengal, for extending all the necessary facilities throughout the research work. I am also thankful to the Non-teaching staff, Department of Zoology, University of North Bengal.

My field study would not have been completed without the devoted help of Mr. Sunil Barman, a fisherman and Ms. Mampi Dey for helping me in harvesting of fishes from the river my field laboratory work, respectively.

Most important, I would like to thank my dear parents Mr. Amar Chandra Dey and Mrs. Dipti Dey who are the pillars of strength and to whom this thesis is dedicated. They have always encouraged and inspired me. My brother, Mr. Apurba Dey, always suggested to me to “dream big” so that I could reach the main goal of my life.

Lastly, I would like to thank all those well wishers who helped me knowingly or unknowingly during the period of the present study.

Place: University of North Bengal

Dated:

Arpita Dey