Gratitude takes three forms “a feeling from the heart, an expression in the words and a giving in return”. First of all, I kneel in utter subservience before God who gave me life to pen this. At the end of my dissertation I would like to thank all those people who made this possible and an unforgettable experience for me.

Foremost, my debt of gratitude must go to my advisor, Dr. J.M. Julka, Professor of Zoology, Faculty of Basic Sciences. His continuous support, sustained encouragement, sincere advice, immense knowledge and parental affection has enabled me to put this tireless venture to fruitful results and making this dissertation worthy of presentation which will remain a part of my memory forever. I could not have imagined having a better advisor and mentor for my study.

With due respect I am expressing my thanks to Dr. S. Puri, Professor and Head, Basic Sciences and Dean Academics for his help, inspiration and scholarly advice throughout the course of this study. I accord my deep sense of gratitude to members of my advisory committee, Dr. Saurabh Kulshreshtha, Associate Professor, Faculty of Biotechnology, Dr. Indu Sharma, Scientist “C” HARC ZSI, Solan, for their apt suggestions and ever available help on going through this work.

Most of the results described in the dissertation would not have been obtained without a close collaboration with few laboratories. I owe a great deal of appreciation and gratitude to Prof. M. S. Johal, Emeritus Scientist, Panjab University, Department of Zoology, Dr. N.S. Nagpure, Senior Molecular Biologist, NBGFR, Lucknow, for their unreserved help and unceasing encouragement during my research work.

I have special words of thanks for Dr. Shwet Kamal, Senior Scientist, Directorate of Mushroom Research, Solan for analysis of the research data.

I am really grateful to my teachers Dr. D.R. Sharma, Prof. S.C. Tewari, Dr. Kamal Dev, Dr. Farooq, Dr. P.C. Sharma and Dr. Azhar for their support and help in various ways.

I am also thankful to Dr. B.D. Sharma, Director, Himachal Pradesh Fishery Department, Mr. Manjeet Singh, Asstt. Director Fisheries, Bilaspur, Mr.
Tapesh Chauhan, Asstt. Director Fisheries, Solan, and Mr. Hamir Chand, Asstt. Director Fisheries, Pong Dam Reservoir, Kangra for providing technical support and staff for fish specimen collection during the entire study.

The formal statement of acknowledgement will hardly meet the ends of justice in the matter of expression of thanx to my parents. “Dad Mum” your unbound affection, sincere wishes, patient advice inspired me and was my driving force to complete this important task of my life. My Brother Sunil, sister-in-law Megha, Sisters Anjana and Sunaina, brothers-in-law Dr. Kapil and Vasu deserve to be put on pedestal of reverence, they are the pillars of support and everreplenishing sources of strength and encouragement. My family thus navigated my academic sails to safety and accomplishment.

Shortcomings are many, during the period of study and so are the disappointments but then I was lucky to have such good friends. I acknowledge my sincere thanks to Anshul, Pooja, Kajal, Prabhjot, Shivani and Navneet. I will remain in debt for the unawaring help, fruitful company and warm wishes of my dearest labmates Sandip, Usha, Shakoor and Abhishek. I owe my sincere thanks to Mr. Jai Singh for his help in laboratory.

All may not be mentioned but none is forgotten. Needless to say, errors and omissions if any are mine.

Place:
Date:

(Rinku Arora)