ACKNOWLEDGEMENT

First and foremost, I thanked God for his countless blessings and good health on me throughout my research work.

In preparing this thesis, I have been greatly benefitted from the writings of many scholars, both from India and abroad, that are available in books, journals and websites, the list of bibliography of which is furnished at the end of this thesis. I also consider myself very fortunate to have Dr S. R. Hajong, Associate Professor, Department of Zoology, NEHU as the guide for my research work. I would like to express my special gratitude to him for his immense support and encouragement at every stage of my Ph.D work. It was his constant inspirations that the research work took off immediately after my Ph.D admission. I have been greatly benefitted from his guidance, knowledge, expertise and research insights which have enabled me to prepare and put the thesis into its final shape.

My special gratitude also goes to all the Heads of the Department, Proff R. N. K. Hooroo, (L) Proff B. Kharbuli, Proff N. Saha and the present HOD Proff S. N. Ramanujam within whose Head shifts I have been able to work as a student, and for providing necessary facilities to carry out and complete my research work without any setbacks.

All the faculty and staff of the Department of Zoology, North Eastern Hill University, with whom the sustainable interactions and advice I used to receive have enriched and enabled me to submit my thesis in a timely manner.

My gratitude also goes particularly my lab mates Jane, Silme, Masha, Macdalyne, Banker and Rudy; also my seniors- Dr H. Kharbani and Dr S. Rahman, and my fellow Research scholars/friends Liani, Pou, Iadei, Carey, Shngain, Ester, Daphi, Chrissie, Bet
and John; whose inspirations and guidance ignited my minds to develop deeper into the sea of knowledge. I would also like to place on record my gratefulness to Dr. James Khongsni, who has immensely helped me, almost right from the beginning of my research work.

With the amount and level of experiments and tests that is involved with this research, I am glad to mention the innumerable help and assistance that I received from the staffs of Sophisticated Analysis Instrument Facilities (SAIF), NEHU, particularly Bah J Nongkynrih, who has taken great care in making sure that we get the best of results from all the experiments that we conducted on TEM.

I would also like to note the pleasant and helpful assistance that I have received from Bah Hep Kharlukhi of the Computer Centre, when I have to encounter a very shocking and unexpected failure with my computer.

I shall also be ever grateful to my family: my husband, W Khardewsaw, my father, R Kharkongor, my mother M Thangkhiew and all my brothers and sister, who have supported and encouraged me throughout the period of my research work, and most importantly to my son, Meshanbor, who has always been a source of inspiration and motivation, someone whom I have always find peace, joy and hope, during the slump of my work and everything else. I am particularly grateful to my father and my husband, who are always available and ever-ready to help me in arranging and handling my gargantuam requirement of bees and bees-colonies for the purpose of the research. To this end, I would fail, if I forget the help and assistance of Mr Kyrshan Syiemlieh, of Syad village, Ri Bhoi District, who had tremendously helped in arranging and acquiring most of the bee colonies that I have been able to reared and used throughout my research work.
At the outset, I would like to place on record my gratitude to UGC, New Delhi for providing Rajiv Gandhi National Fellowship (JRF and SRF) for the financial assistance to complete my research work, up to this point where I am submitting my thesis.

Department of Zoology, (Ibamelaker Thangkhiew)
Shillong – 793002
The May, 2017