ACKNOWLEDGEMENTS

I owe my deepest sense of gratitude and reverence to Dr. Pratap Kumar Pati and Prof. Renu Bhardwaj for their intellectual guidance, constructive criticism and incredible assistance throughout the course of the work.

I am greatly indebted to Prof. Steven D. Clouse, Department of Horticulture Science, North Carolina State University, NC for his intellectual inputs and valuable guidance. I am equally indebted to Dr. Michael Goshe, Mr. Kevin Blackburn, Dr. Tara Nash and other lab members at Department of Horticulture Science, North Carolina State University, NC for their critical comments, valuable suggestions, encouragement and affectionate guidance. I also acknowledge the technical help received from Mr. Gregory Scott.

I am grateful to Prof. Prabhjeet Singh, Head, Department of Biotechnology, Guru Nanak Dev University, Amritsar, for his moral support, constant encouragement and for providing all possible facilities for the accomplishment of the present work. I am also grateful to Prof. Gurcharan Kaur, and other faculty members in the Department for all their help and support during the course of my research work.

I would like to acknowledge the help rendered by all administrative and other staff members of Department of Biotechnology, Guru Nanak Dev University, Amritsar.

I cannot forget the direct and indirect help extended by Mr. Vijay, Rakesh and Hardev. I am thankful to all of them.

It is a great pleasure to extend my thanks to all labmates especially Shivani Saini, Amrita Angurala, Navdeep Kaur, Varinder Singh, Pritika Singh, Ashutosh Sharma, Rupam Guleria, Gurpreet Kaur and Baldev Singh for their help during the course of the present study.

I express my sincere thanks for the help and cooperation of all my friends who directly and indirectly have helped me during the course of study.

It also gives me immense pleasure to acknowledge the moral support and everlasting encouragement of my parents, my brother Priyanshu and other members of the family.

(Isha Sharma)