PREFACE

Watermelon (*Citrullus lanatus*) is an important summer crop in many part of the world including India and its fruits are rich in Carbohydrates, vitamins, minerals and lycopene. It is susceptible to a number of fungal, bacterial and viral diseases. Among plant viruses, Watermelon bud necrosis virus poses significant constraint on watermelon causing necrosis in infected crops.

Watermelon bud necrosis virus (WBNV) is an emerging *Tospovirus*, (family *Bunyaviridae*) on cucurbits in India causing up to 100% crop loss in watermelon. WBNV is an isometric, spherical, enveloped, thrips-transmitted, negative single-stranded RNA virus with a tripartite genome.

Management of viral disease is much more difficult than any other pathogen because of the absence of resistance genes in the germplasm of most crops. In general, viruses have complex life cycle, efficient transmission and wide range of alternative hosts and most importantly, there is no effective viricide available till date. Therefore, it has been one of the primary targets for the development of transgene mediated resistance. The concept of pathogen derived resistance (1986) has opened new milestones for the development of virus resistant transgenic plants. Since then, it is continued to be favoured means for conferring virus resistance.

WBNV is still considered a member of a tentative species, as complete genome information is not known and also in the development of transgenic plants showing resistance to WBNV worldwide, significant information on them has been lacking within India. This dissertation therefore, is devoted to molecular characterization of M RNA segment of watermelon bud necrosis virus genome and transgene expression studies in watermelon. The comparison of M RNA segment of understudy with other tospoviruses has been established. The work further incorporates the studies on transgene expression in watermelon using reporter gene (*GUS*) and nucleocapsid protein (NP) gene of WBNV.

This dissertation incorporates the objectives of work undertaken, techniques used, result obtained, discussion, summary and the references under the following seven headings:

1. **INTRODUCTION:** This chapter commences with a brief introduction to the background and objectives of the problem.
2. REVIEW OF LITERATURE: This provides in depth studies done in serological, biochemical and molecular characterization of the virus (WBNV as a member of Tospovirus), the work done so far towards development of virus resistant transgenic plants and the possible mechanisms of resistance proposed.

3. MATERIALS AND METHODS: The chapter describes the experimental procedure and techniques that were employed in order to accomplish the objectives of the dissertation.

4. RESULTS: Details of various observations made and results obtained from the experiments and that were performed are described in the chapter.

5. DISCUSSION: Detailed analysis of results obtained and conclusions drawn are described in this chapter.

6. SUMMARY: This chapter summarizes the work that has been presented in this dissertation and conclusions drawn from it.

7. REFERENCES: This chapter lists the publications that have been referred to the dissertation.