Preface
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In the tropical climatic conditions of India, rearing of multivoltine and their hybrids of silkworm *Bombyx mori* derived by crossing with males of exotic bivoltine breeds are practised since the hybrids are known for exhibiting desirable qualitative and quantitative traits and are known to exhibit non-diapause nature of eggs and adaptability to tropics. As a result, nearly eighty percent of the silk is contributed by multi x bi hybrids. With the introduction of new techniques of rearing, several attempts are being made to introduce bivoltine silkworm breeds and successful exploitation of bivoltine was possible in our country only when scientific methods of rearing are practised (Datta *et al.*, 2001)

Concomitant with the development of sericulture industry in India, several new multivoltine and bivoltine gene pools were developed and they were crossed in different combinations to derive promising multi x bi hybrids. During the development process, the silkworm breeders designed several novel procedures for evaluating the pure breeds/cross breeds for adjudicating the superior hybrids. As a result, systematic approaches are in vogue among silkworm breeders to better the best so that elite breeds are provided to the farmers for successful harvest of cocoons. But, it is important that genetic system of the breeds are bound to alter during continuous rearing of progenies resulting in the poor performance and deterioration of economic traits. In such cases, there is definitely a need for evolving potential breeds utilizing the locally adopted genotypes crossed with productive exotic breeds and/or improving the quantitative traits of races through genetical approaches.

Perusal of literature clearly shows that systematic approaches were made in our country to evolve multivoltines (Narasimhanna and Gururajan 1965; Sidhu, 1967; Sidhu *et al.*, 1968; Subramanya & Sreerama Reddy, 1982 and Vasudev *et al.*, 1994), bivoltines (Krishnaswami, 1983; Datta Pershad, 1988; Basavaraaja, 1996; Siddiqui *et al.*, 2001; Maribashetty & Aftab Ahamed, 2002; Kalpana *et al.*, 2005; Suresh Kumar *et al.*, 2003, 2004 & 2006; Dandin *et al.*, 2006 and Sudhakara Rao *et al.*, 2007) and introduction of promising multi x bi hybrids in addition to bivoltine hybrids (Krishnaswami & Narasimhanna, 1974; Narasimhanna, 1976; Jolly, 1983; Subba Rao,
During this process of identification of superior hybrids, the genetic constitution of the silkworms are systematically analysed to understand their potentiality and level of expression of qualitative and quantitative traits in a known or different environment through novel biometrical procedures which were systematically adopted in livestock improvement programmes. As a result remarkable progress has been made in our country in the breed improvement programmes. The most popular methods adopted to evaluate the combining ability are line x tester and diallel analysis. In the light of the above and understanding the importance of biometrical procedures in silkworm breeding and genetics, the present investigation has been undertaken utilizing the multivoltine and bivoltine breeds developed in the department of sericulture, University of Mysore along with popular breeds/race and the results of these studies are incorporated in the following three chapters of the thesis.

1. Evaluation of multivoltine and bivoltine breeds/race of the silkworm, *Bombyx mori* for quantitative traits employing inbreeding co-efficient, narrow sense heritability and evaluation index.

2. Combining ability for quantitative traits in multivoltine and bivoltine breeds/race of the silkworm, *Bombyx mori* through line x tester analysis in identifying superior multi x bi hybrids.