PREFACE
Hailing from a sericulturist's family, I have always wondered, from my childhood, how a tiny silkworm could produce a silk filament of more than half-a-kilometer of fine silk thread. Up to my graduation, I helped my father in rearing silkworms, like bringing mulberry leaves from the garden, chopping the leaves, feeding the silkworm, picking the 'ripened worms' for mounting on 'chandnikes', harvesting silk cocoons, and some times in marketing. It was only during my graduation I learnt that the silk thread is an animal fibre and a natural one, with extensive lengths, ranging from 0.5 to 2.0 kilometres. This was the point of attraction that made me to take Sericulture as the subject for my post graduation (M.Sc.) at the Sri Krishnadevaraya University, Anantapur. I learnt that India is the second largest silk-producing country, only next to China, and within India the state of Andhra Pradesh is placed second, next to Karnataka state. I was happy that Anantapur is in the first position among the Sericulture districts of Andhra Pradesh. However, I could not digest the fact that the quality of Indian silk in India in general and of Anantapur in particular is low, far behind the international standards.

I observed many irregularities, in both the breed and the rearing environment of the silkworm. Andhra Pradesh has been practicing Sericulture only from the early part of 1990s. Sericulture spread to Anantapur district of Andhra Pradesh from the border Districts of Karnataka, especially from Kolar. Thus, Sericulture in Andhra Pradesh should be viewed as a traditional one. The commercial silkworm hybrid used in this area being cross breed (commonly called as CB) between the multivoltine Pure Mysore (PM) and the bivoltine NB4D2. The mulberry variety grown was a 'local' variety, with small lobed and thin leaves that cannot suit high-yielding silkworm hybrids like bivoltines. The rearing environment was also not a congenial one, with more fluctuations in temperature and relative humidity. The climate of Anantapur district is generally semi-arid. This zone has a fluctuating climate. The temperature goes up as high as 48°C, and the relative humidity (RH) goes down as low as 20%. I understood that the low cocoon yield in this area is due to high temperature and low humidity during summer seasons.
The cocoon weight ranged from 1.8 g during winter to 1.1 g during summer. With such feed and rearing conditions, the rearing of bivoltine silkworms is not at all possible. I gathered that the Central Silk Board (CSB), India is advocating the rearing and production of bivoltine silkworms with new cultivation and rearing technologies of its research institutions. The issues connected with temperature like low and high temperature are studied in India and in other Sericulture countries like Japan and China. However, the effects of high temperature and low humidity on different silkworm varieties, to my knowledge, are not conclusively studied. The only general conclusion drawn in the literature is that humidity acts on the insect indirectly but not directly. There are rare reports that humidity may act on the insect directly, if it goes beyond a critical level. This subject has become a guiding force for my thesis.

Presentation of this work has been organized into 6 Chapters, describing sequentially the temperature and humidity effects on the life cycle of Bombyx mori. Thus, the 1st Chapter deals with the overt physiology of hatching; the 2nd one with larval-to-larval ecdysis; the 3rd one with larval-to-pupal ecdysis and the 4th chapter with the silk moth eclosion. The fifth chapter is concerned with growth and biochemical parameters of the larvae and silk gland during 5th instar, with analysis of the silk synthetic activity of silkworm by means of estimating amino acids, carbohydrates and total proteins. The 6th chapter is devoted to assess the results and implicated them in economical improvement of the end product viz., the silk fibre. As the experimental insects I selected are of pure breeds; Pure Mysore (PM), an indigenous multivoltine silkworm strain and NB4D2, an evolved bivoltine strain at the Central Sericultural Research and Training Institute, Mysore; and their F1 hybrid, PM x NB4D2, I felt it is not necessary to extend the work on to egg laying phenomenon.

The current period is the peak stage in Indian sericulture with its rapid development, expansion to non-traditional zones of the country and the country
as well as the State is embarking on the quality of silk by introducing bivoltine sericulture technology. I hope that the work initiated and the encouraging results I have obtained will be an inspiration to the other researchers in the field. I trust that these findings become popular with the sericulturist and are used for better and improved production of international quality silk.

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