



## DEVELOPMENT OF A MODEL REARING HOUSE OPERATING ON SOLAR PASSIVE ENERGY FOR SILKWORM SEED CROP UNDER TROPICAL CONDITIONS

G.Vemananda Reddy<sup>1\*</sup>, T. Jayappa<sup>1</sup>, K. L. Rajanna<sup>1</sup>, B. S. Angadi<sup>1</sup> Minni Sastry<sup>2</sup> and H. H. Ninga Setty<sup>2</sup>

<sup>1</sup>Silkworm Seed Technology Laboratory, Kodathi, Carmelram Post, Bengaluru 560035, India.

<sup>2</sup>The Energy and Resources Institute, Dommalur, II Stage, Bengaluru 560071, India.

\*E-mail: vemanandareddy@gmail.com

### ABSTRACT

In India, about 7,96,000 families in 53,814 villages are involved in sericulture industry with about 6 million people having their livelihood out of it. One of the main activities in sericulture is rearing of silkworms for which the use of a rearing house is essential. Healthy and successful silkworm rearing needs optimum levels of temperature (23-28 °C) and relative humidity (70-85 %). Under the tropical climate, it is a difficult task to provide these desired conditions to silkworms. In conventional type of rearing houses, the room temperature and humidity are maintained by using electrical heater and humidifier. Hence, in an effort to develop a cost-effective, eco-friendly and solar energy based rearing house, the Silkworm Seed Technology Laboratory (SSTL), National Silkworm Seed Organization, Central Silk Board, Bengaluru, India and The Energy and Resources Institute (TERI), Bengaluru, India undertook a collaborative research project. TERI contributed in designing and building of the solar passive silkworm rearing house of first of its kind at SSTL in 2011. Later, SSTL test verified the efficacy of this model rearing house in three main seasons of the year during 2011-13. Popular silkworm breeds, CSR2 and CSR4 were reared in both the solar building and control rearing house to compare the results of seed crop rearing between the two houses. Efficacy of the solar rearing house in maintaining temperature and humidity was almost on par with that of control rearing room indicating its suitability for conducting silkworm seed crop rearing.

**Key words:** ERR, humidity, seed crop yield, solar passive energy rearing house, temperature.

### INTRODUCTION

There are many contributing factors attributed towards cocoon yield, such as leaf quality, silkworm race, variations in temperature and humidity *etc.* The required temperature for optimal growth of silkworm ranges between 23 and 28 °C and the desired relative humidity (RH) is in the range of 70 to 85 % (Krishnaswami, 1978; Kawakami, 2001). Rearing house is an essential component of the infrastructure required to conduct silkworm rearing to produce quality cocoons. The structure, orientation, materials used for construction of rearing house and agro climatic conditions play a vital role in maintenance of temperature and humidity during silkworm rearing. Even though some traditional methods are being adopted by farmers for maintaining the

temperature and humidity, they often realise very low cocoon yield mainly due to difficulty in maintaining optimum level of temperature and humidity in the rearing house. The main objective of the joint venture undertaken by the Silkworm Seed Technology Laboratory (SSTL), National Silkworm Seed Organization, Central Silk Board, Bengaluru and The Energy and Resources Institute (TERI), Bengaluru was to develop and demonstrate a solar passive building for silkworm rearing by utilizing solar passive energy for maintenance of optimum condition during silkworm rearing throughout the year for improving the quality of seed cocoon. TERI have extensive expertise on active as well as passive solar thermal systems and many energy and environmental technology development related issues. The SSTL has exclusively been involved in silkworm seed production