Infrared thermal profiling and management of diseases affecting the biological cycle of *Antheraea assamensis* silkworm

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The present study has been designed to establish the thermal profile of complete life cycle of the *Antheraea assamensis* (muga) silkworms starting from the eggs to the moth. The current study also concurrently addresses the applicability of infrared thermography (IRT) to detect muga larvae infected with pebrine. Because of its non-contact advantage, IRT imaging can be successfully manoeuvred to reduce the risk of spreading infections and ultimately lead to increased silk production. The images and data obtained by the non-invasive IRT technology can be implemented, analysed and translated into deep learning algorithm-based machine learning called 'smart data', which can be fine-tuned to develop an artificial intelligence (AI) and decision support system (DSS) for the management and monitoring of silkworms in their entire life progression. Hence, this will boost their productivity, which will further revolutionize their yearly production and convey attractive revenues in the global silk picturesque.

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for measuring body temperature, using thermocouples has been the classical procedure for estimating the thermoregulatory ability of species[4]. However, as an invasive method, it has several limitations, such as a strong influence on the studied individuals, causing injuries or altering their behaviour[5] and preventing the collection of reliable behavioural data associated with body temperature variations. Infrared thermography helps in taking incessant temperature measurements of several body parts noninvasively, without perturbing the animals' behaviour or social interactions[6,7].

With new inventions like smart machines and sensors cropping up in agriculture and other sectors of farming, surfacing technologies like the Internet of Things and cloud computing are introduced to leverage the transition from the traditional model of farming to artificial intelligence (AI)-based 'smart farming'[8–11]. AI-based model, viz. NADRES v2 (National Animal Disease Referral Expert System version 2) has been developed to predict economically important livestock disease outbreaks in India and reduce its economic and social impact on the entire country[12]. Infrared thermography has been reported as a