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Impact of high temperature on growth and development of Silkworm(Bombyx mori L.)

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In Sericulture several factors contribute in the growth and development of silkworm for the production of good quality cocoons in farmer field, such as biotic and abiotic factors is of vital importance. Among the abiotic factors, temperature play a major role on growth and productivity in silkworm, as the poikilothermic insect. To rear silkworms late age silkworm prefers relatively lower temperature than young age (Krishnaswami, 1994). Good quality cocoons are produced within a temperature. Increased temperature during silkworm rearing particularly in late instars accelerates larval growth and shortens the larval period. On the other hand, at low temperature, the growth is slow and larval period is prolonged (N. Suresh Kumar *et al*. 2003). The optimum temperature for normal growth of silkworms is between 20°C and 28°C and the desirable temperature for maximum productivity ranges from 23°C to 28°C. Temperature above 30°C directly affects the health of the worm. If the temperature is below 20°C all the physiological activities are retarded, especially in early instars worms become too weak and susceptible to various diseases (V. K. Rahmathulla, 2012).

Mubashar Hussain *et al.* (2011) found that the silkworm lines under stress humidity yielded low number of eggs even at standard rearing temperature (25±1°C). The variations in number of eggs occurred due to fluctuations of temperature and humidity and interaction with silkworm lines. The moths which were emerged from the larvae which were reared at standard condition showed better results for fecundity as compared to other combinations of temperature and relative humidity. Similarly, the performance of silkworm lines at different temperatures was observed i.e. lower numbers of eggs were produced at higher temperature and lower humidity level. Muhammad Naeem *et al.*, (2011) Analyzed silkworm larvae under natural conditions with little modification in the micro environment of the rearing rooms. This makes the larvae to strive for their survival against the stress environment depleting much of their energy resources in maintaining homeostasis ultimately influencing quantitative and qualitative traits adversely. It can be concluded that exposure of later age (4th and 5th instar) silkworm larvae to

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variations in temperature and humidity (above 25 ± 1°C and below 70% RH respectively) elicited low hatchability and pupation rate. The study also illustrated that higher larval mortality resulted when larvae were exposed to higher temperature (30 and 35°C) and lower RH (55 and 65%). This implies that cocoon crops for seed purpose require optimum conditions of temperature and humidity during larval growth and development. N. Suresh Kumar and Harjeet Singh (2012) this study gives Unfavorable environment during rearing results in poor performance of parental lines. Exposure of seed cocoons to high temperature of 35°C in combination with low relative humidity results in decreased egg recovery and increased incidence of unfertilized eggs (Ayuzawa et al., 1972). The occurrence of unfertilized eggs was more common in summer as compared to other seasons (Biram et al., 2009). Larvae and cocoon exposures to 35°C or above results in poor performance of silkworm moths in relation to egg number and egg fertility and high temperature during rearing, cocooning, mating and oviposition induced unfertilized egg laying (Gowda, 1988). Rate of development and physiology of larvae may be influenced by high temperature which results in alteration in metabolism causing reduced egg yield, increased mortality and enhanced disease incidence due to the production of apyrene sperm which results in the production of unfertilized eggs. The apyrene production reduces at 35°C by 50% resulting in increased egg infertility.

finally output from silkworm mainly depends on favorable environmental conditions. During summer if the rearing temperature will fluctuate it directly affects the silkworm growth and development, mortality rate, pupation rate, egg fertility. At present condition there is a necessity of identifying temperature tolerance silkworm breeds.

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