INTRODUCTION

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In India sericulture is the second largest cottage industry next to handloom and now ranks second in global production of mulberry raw silk amounting to 11,487 metric tons in 1990 (Statistical Binnual:Silk in India, Central Silk Board, 1992,p. 2). Among the states in India, West-Bengal ranks 4th in mulberry silk production covering an area of 17,165 hectare with an annual production of 829metric tons (Ibid.p.69) and is practised almost throughout the year in most of its districts.

Throughout the world the rearing of silkworm Bombyx mori (Lepidoptera: Bombicidae) is practised exclusively indoor. On account of domestication for a very long period of time the insect has acquired an inherent sensitivity to fluctuating environmental temperature and humidity. Even the temperature and humidity optimum for best metabolic activity, growth and performance of different stages of life cycle such as larval instars, pupa and adult are quite different. In order to get a good economic return the need for an optimum range of temperature and humidity has been emphasized by many autorities (Matsumura, 1928; Matsumura et. al., 1928; Kogure, 1933; Takada et al., 1961; Ueda and Iizuka, 1962).

In West Bengal the rearing of silkworm by most of the farmers is done usually in impoverished room made up of mud wall and tile or thatch roof. No sophisticated device is adopted for temperature and humidity regulation. With the seasonal fluctation of ambient conditions the rearing room temperature varies from 15 to 37° C and r.h. from 36 to 96%. During wet part of summer in

West Bengal, particularly during July and August the rearing room temperature ranges from 27 to 32° C and r.h. from 86 to 96%. Such a situation has been proved most unfavourable for silkworm rearing (Annual Report of C.S.R.&T.I., Berhampore, 1987-88, pp.114-115).

At higher humidity mulberry leaves wither very slowly, inducing faster consumption, favouring digestibility and conversion efficiency and consequent growth of silkworm larva (Sharada and Bhat,1957). Further, a luxuriant growth of mulberry during July-August provides an additional impetus to the farmers for one large scale rearing of silkworms. However, the advantages face a set back as because the resultant 5th instar larvae become physiologically weak in resisting diseases caused by micropathogens (Yokoyama, 1962), particularly the bacterial disease flacherie causes a serious concern (Chigasaki, 1937). Though the larval duration is shortened at a relatively high temperature coupled with higher humidity (Takada et. al., 1961) the 5th stage larvae become susceptible to mortality(Ueda and Iizuka 1962).

Thus,at high humidity and relatively high temperature during wet part of the summer in West Bengal, like many other tropical silk growing parts of India a considerable amount of crop loss is an imperative due to high rate of mortality of silkworm larvae (Subba Rao et.al.,1991). Further, there is a high incidence of yellow-stained cocoon production as a consequence of excess urination

due to accumulation of excess water in the body during the rainy season (Pathak and Vyas, 1988). Yellow staining impairs considerably the recovery of raw silk fibre from the cocoon shell (Kumararaj, 1972) and thus incurs a heavy crop loss. Added to these is the higher proportion of pupal death followed by melting within the shell (Giridhar et al., 1990).

The differential water and nitrogen contents of many host plants at different seasons have been found to influence the performance of many species of folivore lepidopterans. Acquisition of sufficient energy from nitrogen and other nutrients including water determines th e success of these folivores (Scriber and Slansky, 1981). The moisture level of mulberry leaves also varies in different seasons (Pathak and Vyas, 1988) and depending on leaf maturity (Kawase, 1914; Hiratsuka, 1917). The peak level in tropical parts of India reaches during July-August and in the tender leaves.

Silkworm larvae acquire body water from the diet (mulberry leaves), undoubtedly a higher amount of body water accumulates from high-water diets. The avenues of water loss from the body are transpiration and along with the faeces But a high r.h. restricts a transpiratory loss. With the progress of age the body water of 5th instar larvae is gradually depleted through balanced regulation of urination by diuretic hormone and reduced to the lowest level just prior to spinning(Ueda and Suzuki, 1967).

Thus, an optimum water balance is needed by silkworms for their balanced growth, survivability and silk production. Larval

body water above or below the tolerable range will be lethal and impair silk yield. The dietary water affects this over all performance of B. mori

In order to boost up silk production by exploiting the large scale availability of mulberry leaves and congenial ambient situation favouring quick larval growth during wet part of the summer in tropical situations, one of the possibilities might be the feeding of larvae with mulberry leaves having desired percentage of water. This may restrict water accumulation in the body of larvae and minimize consequent damages. But except an attempt by Narayanprakash et al., (1985) no information is in hand regarding the optimum percentage of mulberry leaf water suitable for better output during the unfavourable period under consideration.

The present investigation is an attempt to know the impact of different levels of foliar water on the local multivoltine Nistari race of B. mori during July-August and to find out an optimum level of dietary water for better performance accompanied with least crop loss.

The multivoltine Nistari race of B. mori has a great commercial importance in West Bengal and is used extensively as mother for the production of hybrid seeds by crossing with bivoltine male races. At present such hybrids are reared commercially only during the favourable seasons. Further apart from round the year rearing Nistari is the only race reared

extensively even during the most unfavourable period. All these stand for chosing this race for investigation.

The 5th instar larvae alone consumes about 87% of the total consumption by all the larval instars (Matsumura and Takeuchi, 1950). The mortality is also highest at the 5th stage in general in all seasons, more particulartly during wet part of the summer. This is why the investigation has been undertaken from this stage onwards.

With the above objectives the following experiments have been designed to know the impact of mulberry leaf moisture on:

1. Consumption and utilizatin of mulberry leaves, larval growth and duration
2. Efficiencies of conversion of consumed leaves into cocoon (Pupa with shell) and shell alone
3. Consumption and utilization of leaf nitrogen for the nitrogen of shell
4. Larval body water and faecal water with reference to leaf moisture
5. Rearing result
6. Cocoon melting
7. Reproductive performance
   and
8. Reeling character of cocoon and silk filament character.

The experiments at serial numbers 1-3 are basically concerned with the nuritional efficiency. But these are treated here in compartmentalized way so that the essential commercial aspects can well clarified.