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Studies on Identification of Potential Bivoltine Hybrid of Silkworm Bombyx Mori L. for Quality Cocoon Productivity In Western Region of, Maharashtra State

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ABSTRACT

Maharashtra is largest silk producer out of which Nontraditional states of India and western zone is contributed more than 40 % out of which silk production of 252 MT and bivoltine silk is excel of industry where climate fluctuations during the rearing lead to adverse effects on bombyx mori L and .badly suffer. aims to identify potential hybrids for tolerance to adverse temperature and relative humidity. fourth day of fifth stage silkworm larvae were subjected to high temperature of 37 ± 1° C with RH of 52 ± 5 % for 8 hours until spinning .two hybrids. Significant varied were found for potential in adverse climate .out of which five hybrids were evaluated base of index value 50 (CSR6XCSR26) X (CSR2XCSR27) double hybrid (70.6) and (CSR17XCSR19) (62.6) and new double hybrid highly potential over control CSR2xCSR4 in respect of cocoon yield (11.23 %) single cocoon weight(5.4 %) cocoon shell weight (7.9 %) and silk percentage (2.8 %) and filament length (6.9 %) and over all parameters are indicate to significantly and to be recommended in field.

Keywords: Bivoltine Hybrid, Bombyx Mori L Performance

I. INTRODUCTION

The mulberry silkworm, Bombyx mori L. (Lepidoptera: Bombycidae), is an economical insect and domesticate by provide as fed of mulberry leaves which is a sole food plant for the purpose of silk production in the world . At present bivoltine sericulture is an excel of the silk industry of the india and other country and need to be compete for silk market of international level the india is an second largest producer of silk in world and is contributing nearly 5% in productivity of bivoltine silk. Bivoltine silkworm is highly susceptible .for adverse climate and need to careful domestication over centuries has apparently deprived this commercial insect of the opportunity to acquire adverse climate. . lots of factors responsible for poor results of the bivoltine silkworm rearing in laboratory and field level under tropical conditions, the major one is lack of adverse climate. Many quantitative and qualitative characters decline sharply at higher temperatures. Therefore, one of the key considerations in developing bivoltine breeds for tropics could be the need for adverse temperature tolerateThe recent silkworm breeding and those in stress-induced protein synthesis have opened up new avenues to evolve to robust productive silkworm hybrids (; Vasudha et al. 2006; Srivastava et al. 2007;Moghaddam et al. 2008).

BivoltineSericulture in India is practiced predominantly in tropical environmental regions such as Karnataka, Tamil Nadu, Andhra Pradesh, and West Bengal and to a limited extent in the temperate environment of Jammu and Kashmir. This situation provides scope for bivoltine hybrids as a commercial venture as hybrids are hardy and have the ability to survive and reproduce under fluctuating climatic conditions. of nontraditional sericulture zone of Maharashtra state.

However, hybrid quality is low when compared to the existing international standards. For example, cross breeds of polyvoltine female x bivoltine male are generally reared in these regions during the summer, but the quality of cocoon production is not as high as it is for bivoltine silkworm hybrids (Ramesha et al. 2009). Bivoltine silkworm breeds are known for their qualitative and quantitative traits in the sericulture industry. During the last decade, a number of silkworm hybrids have been developed (Basavaraja et al. 1995; Data et al. 1997) and selected for exploitation at the field level during favorable season in coarse of silkworm rearing.

II. OBJECTIVES

The purpose of this study is to obtain new data about identification for t in silkworm larvae, not only to augment current knowledge on gene expression under stress conditions, but also to provide valuable information that will allow identification of thermotolerant bivoltine silkworm breeds based on the silkworm rearing performances relative to nine important economical genetic traits.

III. METHODS AND MATERIAL

The five silkworm breeds used were, CSR2xCSR4 CSR17xCSR19 ,(CSR6XCSR26)x (CSR2xCSR27) CSR50 xCSR51 PM XCSR2. These hybrids with varied qualitative and quantitative parameter, are observed and maintained during the silkworm rearing silkworm eggs from each hybrids were reared and cocoons were harvested and maintained until emergence of moths. Disease free female moths emerging on the peak day of pupal stage were allowed to mate for 3 to 4 hours and held until fertilization and depaired the moths. Mother moth will kept for oviposition and laid eggs more than 500-550 per female which are need to be acid-treated within 20 hours after eggs layings of silkworm before initiate the hibernation process with the method developed by Yokoyama (1962) to prevent hibernation. The eggs were incubated at 25 ± 1° C temperature and 70 to 80% RH after surface treatment with 2% formalin solution. 20 to 30 eggs were chosen from each hybrids and pasted onto egg sheets. Three such egg sheets for each breed were prepared, wrapped in white tissue paper and boxed with black paper to synchronize the embryonic development. On the day of hatching, the eggs were exposed to light in order to obtain uniform hatching and freshly chopped mulberry leaves were fed to the young larvae. The whole process, from silkworm egg incubation to completion of rearing activities, was carried out under hygienic conditions in a silkworm rearing under laboratory conditions and disinfected with bleaching powder and astra/sanitech.

Silkworm rearing was conducted for each breed in plastic rearing tray by provided as feeds to larvae of the V1 variety of mulberry leaves from the well-maintained irrigated mulberry garden at research institute A standard rearing procedure was adopted as recommended by Datta (1992). The young larvae (1st-3rdinstars) were reared at 26-28° C with 80-90% RH and late age larvae. (4thand 5thinstars) were maintained at 24-26° C with 70-80% RH until the 3rd day of fifth instar until formation of silky cocoon.

The study was conducted out between april and may.2016 Silkworm rearing was taken with standard method under the recommended temperature and relative humidity until the 3rd day of the fifth instar. On the 4th day of the fifth instar, 150larvae per breed in three replications of 50 larvae were selected for the high temperature treatment. High temperature treatment was obtainedan environmental growth chamber with precise and automatic control facilities for uniform maintenance of temperature and humidity. The temperature used was 37 ± 2oC and RH 51 ± 6%. Fresh mulberry leaves were given twice a day to larvae A control group was maintained at ambient temperature of standard rearing conditions at 25 ± 1oC and RH 65 ± 5%. Thermal exposure was given every day for six hours until spinning (10:00-16:00) since continuous exposure to high temperature conditions reduces quantitative breeds improve to tolerate adverse temperature and relative humidity under laboratory experiment for identification of potential bivoltine hybrids in non traditional sericulture region western part of Maharashtra . Observations were carried out daily and mortality due to raise the temperature and reduce the relative humidity in atmosphere in each of the breeds of silkworm was observed . After arrangement by artificial treatment, for optimum climate the practices silkworm larvae were shifted to the mountage for spinning at normal temperature of 25 ± 2° C and RH 65 ± 5%. For cocoon formation . the Cocoons were harvested 5th days and accessed for survival to . pupation rate was significant

assesment of silkworm rearing, perfomence on larvae and cocoons for the eight parameter (larval weight, cocoon yield for 10,000 larvae by number and weight, pupation rate, cocoon and shell weight, shell ratio, filament length) were collected and calculated

IV. RESULT

Differences were marked amongst the bivoltine breeds at high temperature. Data were obtained for larva weight, yield by 10,000 larvae by number and weight, pupation, cocoon weight, shell weight, shell ratio, filament length and for 5bivoltine breeds under normal and high temperature treatments. There was evidence of clear declines in all economic parameter in all of the high temperature Among control and high temperature treated groups, maximum larval weight in (CSR6XCSR26)X(CSR2XCSR27)-W(41.8 g) CSR50XCSR51(39.8 g), CSR17XCSR19 (38.5 g) and minimum in PMXCSR2 (33.1 g) with an average of 36.8 g was estimated. Highest yield /10,000 larvae by number was observed in double hybrids (9245) and lowest in PMXCSR2 (9112) with an average of 8745 under lab conditions the double bivoltine hybrid is potential in adverse climatic as high temperature and low humidity in summer season.

PERFORMANCE OF SILKWORM REARING

Name of breeds	Larval wt (gm)	Cocoon yield/ 10000 (By no)	Pupation rate(%)	Cocoon wt (gm)	Shell wt (gm)	Silk (%)	Filament length (m)
(CSR6 XCSR26)X(CSR2XCSR27) (Control)	41.8	9245	93.6	1.76	.39	22.1	1098
(Treated)	38.2	7247	70.1	1.54	.31	20.1	955
CSR50 XCSR51 (Control)	39.8	9148	92.2	1.71	.37	21.6	1083
(Treated)	35.2	7025	69.4	1.51	.30	19.8	944
CSR17 XCSR19 (control)	38.5	9123	91.5	1.72	.36	20.9	1084
(Treated)	34.9	7019	69.3	1.50	..29	19.3	935
CSR2X CSR4((control)	38.3	9121	91.2	1.69	..34	20.1	1065
(treated)	34.4	7012	68.5	1.49	.28	18.7	926
PMXCSR2 (control)	37.2	9112	90.9	1.48	.27	18.2	989
(treated)	33.1	6989	68.3	1.41	.23	16.3	905

V. Discussion

On the summer season and due to high temperature the silkworms showed a decline with the increase of temperature above standard level. A similar result was observed Temperature stress causes a number of abnormalities at the cellular level as the normal pattern of protein synthesis halts. Another important effect of temperature (or stress of any kind) is the unfolding of cellular proteins. Cellular proteins are typically folded in their native conformations while functioning in cells. This process can result in aggregates of unfolded protein that at best diminish the pool of functional proteins a The isolated hemocytes of polyvoltine breeds exhibited the induction (Joy and Gopinathan 1995). For instance, polyvoltine breeds reared in tropical countries are known to tolerate slightly higher temperature, as are cross breeds that have evolved for a tropical climate (Ramesha et al. 2009).

The success of the sericulture industry depends upon several variables, but environmental conditions such as biotic and abiotic factors are of particular importance. Among the abiotic factors, temperature plays a major role on growth and productivity of silkworms (Benchamin and Jolly 1986). and that fluctuation of temperature during different stages of larval development was found to be more favorable for growth and development of larvae than constant temperature. There is ample literature stating that good quality cocoons are produced within a temperature range of 22-27° C and that cocoon quality is poorer above these levels (Krishnaswami et al. 1973; Datta 1992; Datta et al. 1996, 1997). However, polyvoltine breeds reared in tropical countries are known to tolerate slightly higher temperature (Hsieh et al. 1995), as are cross breeds that have been developed for tropical climates. In order to use bivoltine races in tropical and area of pune , it is necessary to have a stable cocoon crop in a high temperature environment. High temperature affects nearly all biological processes including the rates of biochemical and physiological reactions (Hsieh et al. 1995; Willmer et al. 2004), and can eventually affect the quality or quantity of cocoon crops in the silkworm. Several reports (Ueda and Lizuka 1962; Shirota 1992; Tazima and Ohuma 1995; Hsieh et al. 1995) demonstrated that silkworms were more sensitive to high temperature during the fourth and fifth stages, which are recommended for the recognition and selection of adverse temperature tolerant silkworm breeds, under high temperature conditions.

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