CHAPTER-III

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Seven Bivoltine silkworm breeds viz. SLD4 x SLD8 (mark larvae, white, oval in shape, slightly constricted in the middle cocoon), Dun17 x Dun 18 (mark larvae, white, slightly constricted in the middle, medium size cocoon), CSR2 x CSR4 (Plain larvae, white, robust oval cocoons), APS105 x APS126 (Plain larvae, white, oval small cocoons), APS45 x APS12 (Plain larvae, white, oval cocoons) CSR46 x CSR47 (Plain larvae, white, robust oval cocoons), Gen3x Gen2 (Plain larvae, white, oval cocoons) and four multivoltine x bivoltine breeds MC1 x BC4 (mark larvae, white, slender elongated cocoon), MC4 x BC4 (mark larvae, deep yellow, robust elongated cocoon), N x NB4D2 (mark larvae, deep yellow, slender elongated cocoon) and PM x CSR2 (Plain larvae, light yellow, robust oval cocoons) were utilized for the present study on the hybrid.

For each of these hybrids, five replications were maintained during different seasons (pooled spring and pooled autumn of the years 2013 and 2014) for various trait and data were recorded. And each experiment was repeated twice and accrued data was subjected for analysis of variance (Kempthrome, 1952). In order to judge and confirmed the superiority of the hybrids and used Multiple Traits Evaluation Index Method advocated by Mano *et al.*, (1992). The index score in different characters or traits thus denotes the performance of a hybrid combinations with relatively higher index value were considered to have greater economic value. Materials and methods applied are as follows:

1. During the process about 4000 silkworm (*Bombyx-mori* L.) larvae have been brushed for each hybrid and after III moult exactly 2500 larvae were retained and divided into five replications consisting 500 larvae of each batch to facilitate undertaking assessment with respect to finalized characters for

statistical analysis. The study was carried out at room temperature ($25 \pm 2 \circ$c and 75-80 % RH).

The observation were recorded on fifteen various silk contributing parameters of economic importance such as fecundity (total number of eggs layed by a female moth), hatching percentage, yield/10,000 larvae by number, yield /10,000 larvae by weight, cocoon weight, shell weight, and cocoon shell percentage, yield per 100 dfls., filament length, filament weight, filament size, reelability, raw silk (%), neatness, boil-off following the standard rearing technology as suggested by Krishnaswami (1978).

Evaluation index was calculated as per Mano *et al.,* (1992). The index score in different score in different characters or traits thus denotes the performance of a hybrid combinations with relatively higher index value were considered to have greater economic value.

2.   Matured silkworms were mounted on bamboo mountages and cocoons were harvested on 7th day after mounting. After harvest, rate of perfect pupation of each cocoon have been checked and verified.

3.   25 females ($\female$) and 25 males ($\male$) cocoons taken randomly from each replication for assessing cocoon weight, shell weight and shell percentage.

4.   The remaining good cocoons (replication wise) have been weighted (for green cocoon weight) stifled in accordance with the approved/ recommend scheduled temperatures and were sent for reeling assessment.

5.   Reeling characters viz., filament length, filament weight, filament size, reelability, raw silk percentage (dry basis) and neatness, boil of loss (shell) have been recorded with five replications.

6.   The hybrid performance and reeling characters have been done for statistical analysis.

7. The Two years rearing data were pooled seasonwise and evaluated by using the method advocated by Arunachalam and Bandopadhya (1984) and Evaluation index was calculated as per Mano *et al.*, (1992).

8. **Cocoon drying :**

Drying of Multi x Bivoltine cocoons

Cocoons were dried using following temperature profile

Temperature	Duration
110°c	40-60 minutes
100°c	40-60 minutes
85°c	60 minutes
70°c	60 minutes
55°c	60 minutes

Drying of Bivoltine hybrid cocoons

Cocoons were dried using following temperature profile

Temperature	Duration
115°c	1 hour
100°c	1 hour
85°c	1 hour
70°c	1 hour
55°c	1 hour

After drying and conditioning the cocoons for one day, degree of drying of cocoons have been calculated as follows:

$$\text{Degree of drying (\%)} = \frac{\text{Dryweight of concoons}}{\text{Green weight ofcocoons}} \times 100$$

9.   **Method of data recording :**

Filament Size (Denier) was calculated by using the following formula :

$$\text{Filament size} = \frac{\text{Conditional weight of raw}}{\text{Total length of raw silk}} \times 100$$

$$\text{Reelability \%} = \frac{\text{Number of reeling concoons}}{\text{Number of feeding ends}} \times 100$$

The reelability is a cocoon character that influence raw silk yield, productivity & raw silk quality significantly. If the reelability of the cocoon is low, number of droppings during reeling increases in the number of feeding ends and hence affects the productivity and uniformity of raw silk. The reelability is influenced to some

extent by racial characteristics of cocoons, but the reelability is significantly influenced by temperature and humidity maintained during cocoons spinning. Thus, reelability is calculated by using the formula.

$$\text{Re elability \%} = \frac{\text{Number of reeling cocoons}}{\text{Number of feeding ends}} \times 100$$

Where,

Number of reeling cocoon = (Number of cocoon taken for testing) -

(Number of new unreelable cocoon) - (Number of converted carry over cocoons)

Number of feeding ends = (Number of castings + Number of converted carry over cocoons) - (Number of converted carry over cocoons)

$$\text{Hatching \%} = \frac{\text{Number of egg hatched}}{\text{Total no. of eggs}} \times 100$$

$$\text{Effective Rate of Re aring (By number)} = \frac{\text{Total no. of cocoon harvested}}{\text{Total no of larvae brushed / reared}} \times 100$$

$$\text{Effective Rate of Re aring (By weight)} = \frac{\text{Total wt. of cocoon harvested}}{\text{Total no of larvae brushed / reared}} \times 100$$

$$\text{Shell Ratio (SR\%)} = \frac{\text{Shell weight}}{\text{Cocoon weight}} \times 100$$

10.　**Multiple trait evaluation index method (Mano et al., 1992)**

Evaluation Index of a trait is calculated as per the following formula :

$$\frac{(A-B)}{C} \times 10 + 50$$

A = Value obtained for a particular trait

B = Mean value of the trait of all treatment

C = Standard deviation

10 = Standard unit

50 = Fixed value

Individual evaluation index values were obtained as mentioned above for each the trait of each hybrid and average cumulative index value over the fifteen characters under study was obtained. The average index value fixed for the selection of a breed was above 50. We considered to possess greater economic value and accordingly the hybrid with evaluation index values (E. I. value) in the descending order were ranked starting with the best one possessing highest value and so on.

Preventive measures/prophylactic measures: During adverse months of Assam climatic condition cocoon crops suffer losses due to silkworm diseases such as grasserie and flacherie. To prevent the incidence and intensity of the diseases, disinfection and dusting technique has been applied. Dusting of Labex (Lime: bleaching powder 97:3) on the silkworm, once in each in star and after moult was applied as prophylactic measures.

Mulberry cultivation and variety: Mulberry belong to the genus *Morus*. Mulberry grows in tropical and temperate climate and grows throughout the year. Mulberry silkworm feed on mulberry leaves. Leaves consumed by mulberry silkworm through rearing converted into raw silk. The variety used in the experiments was Kanva2.