

Performance of Six Eco Races of *Samia ricini* Donovan Reared during Summer Season

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Abstract: The impact of summer season on ten parameters such as fecundity, hatchability, larval duration, larval mortality, life cycle duration, ERR, weight of larva, cocoon and shell as well as shell ratio were observed for six eco races (Strains) of *Samia ricini* such as Greenish Blue Plain (GBP), Greenish Blue Spotted (GBS), Greenish Blue Zebra (GBZ), Yellow Plain (YP), Yellow Spotted (YS) and Yellow Zebra (YZ). On the basis of overall performance, it became evident that summer season remains suitable for rearing of GBS strain as compared to other strains of *Samia ricini* examined during present research work. Thus, rearing of GBS strain of *Samia ricini* is recommended for sub-tropical regions of India for better productivity.

Keywords: Six eco races, *Samia ricini*, summer season, Rearing and breeding performances

1. Introduction

Sericulture is an important sector related to agriculture as cultivation of host plants. This sector provides employment specially to rural population in silkworm rearing, reeling, spinning and weaving. Thus, this sector possesses positive impact on rural economy. Silk produced by silk insects is a natural protein fiber. Tamta and Mahajan (2021) stated that sericulture is becoming popular during recent years in non-traditional silk producing states of India including Bihar.

Sericulture in India is identified as best suitable practice for ideal growth and development of rural areas. All four varieties of silk are produced in North-eastern region of India (Hani and Das, 2010). Mulberry silk is produced mainly in Karnataka, Andhra Pradesh, Tamil Nadu and Kashmir. Tasar silk is mainly produced in Madhya Pradesh, Orissa and Chotanagpur division of Jharkhand. Eri silk is produced mainly in Assam and West Bengal. Muga silk is mainly produced in Assam, Tripura and Nagaland (Kakati and Chuta, 2009). Apart from these traditional areas of silk production, government taking steps in addressing the objectives of promotion of sericulture in non-traditional areas such as Bihar. Bhagalpur district of Bihar is the hub of sericulture in Bihar. Sericulture sector can solve the problem of acute unemployment and can check the rural migration to urban areas. In above mentioned perspective, the present research work was conducted to select suitable eco race of *Samia ricini* for culture during summer season.

2. Materials and Method

This experimental research was conducted during 2022 - 2023. All experiments were conducted in a Completely Randomized Block Design (CRBD) with three replications under laboratory conditions. The place of rearing and equipment's were washed, cleaned, sun dried and disinfected with use of bleaching solution and 2% formalin solution at the rate of 800 ml per square meter of space. Air conditions, humidifiers, digital thermometer and hygrometer were used for monitoring of required temperature and relative humidity in rearing rooms. Proper ventilation was also maintained during course of research work. Plastic trays covered with paraffin paper were used for rearing of different batches of eri silkworm from brushing to cocoon unwinding stages. Timely and proper bed cleaning was conducted especially during larval stage (feeding stage) of eri silkworm for maintenance of hygiene.

Disease free and healthy cocoons of desired eco races (strains) of *Samia ricini* were collected from the Muga and Eri Germplasm Centre, Central Muga Eri Research & Training Institute, (CCMER & TI), Jorhat (Assam).

3. Result and Discussion

During present research work it was found that season had significant effect on different parameters related to rearing, breeding and reeling of *Samia ricini*. Season also remain responsible for variation in the economic characters of different eco races of *Samia ricini*. It might be due to prevailing climatic conditions during specific season. Nutritive value of castor leaves also remain affected by seasons and abiotic factors such as humidity and temperature.

Table 1: Rearing and breeding performance of six eco races of *Samia ricini* during summer season

Sl. No.	Eco races of <i>Samia ricini</i>	Fecundity (No. of eggs per female moth)	Hatchability (%)	Larval duration (d. h)	Larval Mortality (%)	Life cycle duration (d. h)	ERR (%)
1.	Greenish Blue Plain (GBP)	306	77.45	18.3	13.0	40.3	87
2.	Greenish Blue Spotted (GBS)	301	76.41	19.2	17.0	40.8	83
3.	Greenish Blue Zebra (GBZ)	324	75.31	19.2	18.0	40.0	82
4.	Yellow Plain (YP)	308	78.57	19.6	14.0	40.0	86
5.	Yellow Spotted (YS)	315	77.46	18.7	16.0	40.3	84
6.	Yellow Zebra (YZ)	302	73.51	19.9	16.0	41.0	84

Data related to impact of environmental conditions prevailing during summer season on rearing and breeding performance of six eco races of *Samia ricini* is presented in Table - 1. Maximum fecundity as 324 was observed for GBZ followed by YS (315) and minimum fecundity as 301 in GBS strain. Highest hatchability was observed in YP (78.57%) followed by YS (77.46%) and GBP (77.45%). Minimum hatchability during summer season was observed as 73.51% in YZ strain. Longest larval duration was observed in YZ (19.9 days) followed by YP (19.6 days) and

minimum in GBP (18.3 days). Highest larval mortality was observed as 18% (GBZ) followed by 17% (GBS) and lowest as 13% in GBP. As well highest ERR remained as 87% in GBP followed by YP (86%) and lowest in GBZ (82%). Longest life cycle duration during summer season was observed by GBS (40.8 days) and minimum as 40 days in GBZ and YP strains. Thus, again it became evident from the data mentioned in Table - 1 that environmental conditions of summer season variability affected rearing and breeding parameters of all eco races.

Table 2: Economic (reeling) traits observed for six eco races of *Samia ricini* during summer season

Sl. No.	Eco races of <i>Samia ricini</i>	Weight of single larva (gm)	Weight of single cocoon (gm)	Weight of single shell (gm)	Shell Ratio (%)
1.	Greenish Blue Plain (GBP)	8.75	2.80	0.32	11.43
2.	Greenish Blue Spotted (GBS)	9.33	2.85	0.38	13.33
3.	Greenish Blue Zebra (GBZ)	9.72	3.10	0.39	12.58
4.	Yellow Plain (YP)	8.98	2.83	0.37	13.07
5.	Yellow spotted (YS)	8.72	2.81	0.32	11.39
6.	Yellow Zebra (YZ)	9.16	2.80	0.36	12.86

The results obtained during present study are presented below in sequential manner: -

- 1) *Fecundity:* GBZ> YS> YP> GBP> YZ> GBS
- 2) *Hatchability:* YP> YS> GBP> GBS> GBZ> YZ
- 3) *Larval duration:* YZ> YP> GBS= GBZ> YS> GBP
- 4) *Larval mortality:* GBS> GBS> YS= YZ> YP> GBP
- 5) *Life cycle duration:* YZ> GBS> GBP= YS> GBZ= YP
- 6) *Effective rate of rearing:* GBP> YP> YS= YZ> GBS> GBZ
- 7) *Wt. of single larva:* GBZ> GBS> YZ> YP> GBP> YS
- 8) *Wt. of single cocoon:* GBZ> GBS> YP> YS> GBP= YZ
- 9) *Wt. of single shell:* GBZ> GBS> YP> YZ> GBP= YS
- 10) *Shell Ratio:* GBS> YP> YZ> GBZ> GBP> YS

Data mentioned in Table - 2 indicates that weight of single larva remained highest as 9.72 gm in GBZ followed by GBS (9.33 gm) and lowest as 8.72 gm in YS strain of *Samia ricini* during summer season. Highest single cocoon weight remained as 3.10 gm in GBZ followed by GBS (2.85 gm) and lowest as 2.80 gm on GBP and YZ strains. Weight of single shell was observed highest as 0.39 gm in GBZ followed by GBS (0.38 gm) and minimum as 0.32 gm in GBP and YS strains. After calculation of shell ratio highest data as 13.33% was obtained for GBS followed by YP (13.07%) and minimum as 11.39% for YS strain. Thus, after analysis of data mentioned in Table - 2, it became clear that environment conditions prevailing during summer season variably affected different economic traits of different eco races of *Samia ricini* in differential manner. But summer reason remains most suitable for BGS, YP, Y2 and GBZ strains.

Narzary and Brahma (2021) recorded fecundity of *Samia ricini* as approximately 462, 460, 472, and 360 during spring, summer, autumn and winter seasons respectively. Highest fecundity was observed during autumn season. Lalitha *et al.* (2023) recorded lowest fecundity in eri silkworm as 263 during summer and as 284 during early monsoon season. Brahma (2015) recorded slight variation in fecundity of *Samia ricini* during different seasons. Wankhade *et al.* (2014) recorded fecundity as 384 in YZ strain during October - November and lowest fecundity as 311 in GBP strain.

4. Conclusion

The results of present study remain in agreement of results obtained by Sharma and Kalita (2017). This result also remains similar with the findings of Debaraj *et al* (2022). Thus, it became evident during present study that summer season not remain suitable for most of the eco races of *Samia ricini* but summer season remained most suitable for rearing of GBP strain of *Samia ricini*.

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