

# Comparative Study of Rearing Performance of Some Strains of Eri Silkworm, *Samia ricini* Donovan During Autumn Season

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**Abstract:** India is the biggest consumer and second producer of silk in the world while largest producer of eri silk in the world. Eri Silkworm is a multivoltine and polyphagous species but in Bihar, commonly reared on the leaves of Castor (*Ricinus communis* L.). Six strains such as GBP (Greenish Blue Plain), GBS (Greenish Blue Spotted), GBZ (Greenish Blue Zebra), YP (Yellow Plain), YS (Yellow Spotted) and YZ (Yellow Zebra) of eri silkworm were undertaken for this study to observe their rearing performance comparatively during Autumn season. Data obtained after rearing of 300 hatched larvae at a range of 21°C to 33°C temperature and 36.0% to 99.5% relative humidity level. Maximum single larva weight was observed as 11.90 gm in GBP followed by GBS 11.75 gm and minimum as 9.02 gm in YS during autumn season. Maximum single cocoon weight was observed as 3.34 gm in GBP followed by YS 3.30 gm and minimum as 3.20 gm in YP strain. Maximum single shell weight during autumn season was observed as 0.46 gm in GBP followed by YS 0.45 gm and minimum as 0.42 gm in YP strain. Highest shell ratio was obtained as 13.77% for GBP followed by YS 13.64% and minimum as 13.13% for YP strain. Thus, it is clear after analysis data observed among six strains of *Samia ricini* Donovan, GBP strain shows significant increase of all parameters.

**Keywords:** Eri silkworm, *Samia ricini*, Autumn season, Castor, Eco races

## 1. Introduction

Rearing of silk insects at mass scale to obtain silk for commercial as well as personal use is called as sericulture. Sericulture is in practice since time immemorial especially among tribal people of India Eri Silk is the backbone of Indian domestic silk market. Inhabitants of about 61000 villages of India are involved in Sericulture. Sericulture provides ample work for women of these villages. Sericulture requires less specialized skill, thus remain suitable for women. Sericulture requires mostly indoor activities, and less physical energy. The government has a significant role in development of Indian Silk industry. In this direction, it is also essential to select suitable varieties of silkworm having high rate of productivity. Different strains of this silkworm show different dimension of morphological, physiological and growth characters depending on feeding behavior. Voltinism also depends on the strains as well as environmental conditions of rearing such as temperature. In India four type of silks are produced like Mulberry silk, Tasar silk, Eri silk and Muga silk in ratio of 89%, 2%, 8% and below 1% depends upon host plant or feeds like Mulberry leaves, Arjuna leaves, Castor leaves and Som leaves respectively. Singh *et al.* (2003) presented a detailed account of different eco races of eri silkworm have significant impact on productivity of ericulture. Suryanarayana (2005) stated that eri silkworm produces third most important Eri silk after Mulberry and Tussar silk, all around the world. Central silk Board in the year 2022 reported that in India 9087 Metric Ton non-mulberry silk was produced during 2021-22. The eri silk constitutes 81.03% of the total non-mulberry silk produced in India.

## 2. Materials and Method

This experimental work was conducted in 2024 during

autumn season. Disease free and health cocoons of desired eco races of *Samia ricini* were collected. Procured cocoons were stored under normal laboratory conditions for 15 days for proper acclimatization. After proper acclimatization, cocoons were transferred for grainage operation. Acclimatized cocoons were spread on rearing trays in dark conditions. The active males were allowed to mate with females. Then females start to lay eggs. The eggs were disinfected by use of 2% formalin. Then eggs were washed thoroughly with water. Hatching starts after ten days of incubation during morning hours. Then larvae emerge. These larvae were brushed to rearing trays. Chopped tender leaves of host plant was spread on rearing trays to avoid crowding. Leaves of host plant was given as feed at four-hour interval for four-five days. Bed cleaning was conducted regularly during larval development. Five instars of larva develop after moulting four time. The larval period of this silkworm is completed within 30-35 days. The fifth instar stop feeding and start searching a proper place to spin the cocoon. So, fifth instars were transferred to mountage. Here larval stage turns into pupa stage. The spinning of cocoon was completed in 2-3 days.

Provision of suitable light and proper ventilation of rearing rooms are required factors for suitable rearing. Windows and doors of rearing rooms should be open during night and morning hours but closed during day hours in summer season. Windows and doors of rearing room should be kept closed during night and open during day hours in winter season. These measures are required for protection of silkworms for very high and very low temperature conditions. Maintenance of proper hygiene and cleaning eri silkworm. After every bed cleaning process, fresh leaves were spread on top of the larvae in single layer During Cleaning of beds, the worms were kept on paper covered beds. Then bitter containing unused leaves and disinfested.

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Then the larva kept on paper were transferred on rearing trays. This method is a requisite precautionary measure to protect- worm from diseases and death. Data for each parameter was recorded for analysis purpose.

### 3. Result and Discussion

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

Sl. No.	Eco races of <i>Samia ricini</i>	Fecundity (No. of eggs female moth)	Hatchability (%)	Larval duration (d.h)	Larval Mortality (%)	Life cycle duration (d.h)	ERR (%)
1	Greenish Blue Plain (GBP)	426	89.91	19.5	1	40.9	99
2	Greenish Blue spotted (GBS)	420	83.57	20.3	2	42	98
3	Greenish Blue Zebra (GBZ)	412	86.41	20.4	1	41.8	99
4	Yellow Plain (YP)	422	84.36	20.3	3	41.3	97
5	Yellow spotted (YS)	410	80.24	20.3	3	41.5	97
6	Yellow Zebra (YZ)	405	80	21.1	2	41	98

Data related to impact of autumn season on rearing and breeding performance of six eco races of *Samia ricini* is given in Table-1. On the basis of data mentioned in this table the maximum fecundity was observed as 425 in GBP followed by GBS (420) and minimum fecundity as 405 in YZ strain. Accordingly highest rate of hatchability was observed as highest rate of hatchability was observed as 98.91% in GBP followed by 86.41% (GBZ) and lowest as 80% in YZ strain. Longest larval duration during autumn season was observed 21.1 days in YZ followed by 20.3 days in

GBZ, YP and YS strains and minimum as 19.5 days in GBP strain. Maximum larval mortality was observed as 3% in YP and YS strains and minimum larval mortality as 1% was observed in GBP and GBZ strains of *Samia ricini* during autumn season. Longest duration of life cycle was observed as 42 days in GBS followed by GBZ (41.8 days) and minimum as 40.9 days in GBP strain. After calculation of effective rate of rearing, highest ERR% was obtained as 99% for GBP and GBZ strains followed by 98% for GBS and YZ strains during autumn season.

**Table 2:** Economic (reeling) traits observed for six eco races of *Samia ricini* during Autumn 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)	11.90	3.34	0.46	13.77
2.	Greenish Blue spotted (GBS)	11.57	3.21	0.43	13.40
3.	Greenish Blue Zebra (GBZ)	11.15	3.25	0.44	13.54
4.	Yellow Plain (YP)	11.28	3.20	0.42	13.13
5.	Yellow spotted (YS)	10.53	3.30	0.45	13.64
6.	Yellow Zebra (YZ)	09.02	3.22	0.43	13.35

Data related to the economic traits of different eco races of *Samia ricini* are presented in Table-2. Maximum single larva weight was observed as 11.90 gm in GBP followed by GBS (11.57 gm) and minimum as 9.02 gm in YZ during autumn season. Maximum single cocoon weight was observed as 3.34 gm in GBP followed by YS (3.30 gm) and minimum as 3.20 gm in YP strain. Maximum single shell weight during autumn season was observed as 0.46 gm in GBP followed by YS (0.45 gm) and minimum as 0.42 gm in YP strain. Highest shell ratio was obtained as 13.77% for GBP followed by YS (13.64%) and minimum as 13.13% for YP strain. Thus, it again became clear after analysis of data mentioned in Table-2 that environmental conditions of autumn season influenced different economic traits of all six stains of *Samia ricini* in differential manner.

### 4. Conclusion

Greenish Blue Plain (GBP) stain showed significant increase of all parameters studied during autumn season along all six eco-races of *Samia ricini* examined during present research study and it became evident that autumn season remained suitable than summer season for rearing of all eco races of *Samia ricini* examined during present research study.

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