YIELD GAP ANALYSIS AT FARM AND FARMER LEVEL IN ERICULTURE OF COSTAL ODISHA, INDIA

[1]Swayamsiddha Swain, [2]Dr. Yashaswi Nayak
[1]M.Phil Scholar, [2]Supervisor
[1,2]Department of Zoology, Centurion University of Technology and Management (CUTM), Bhubaneswar campus, Odisha, India

***Abstract**:* This study has been undertaken to study the yield gap in the farm and farmers level of *Philosamia ricini* or eri silkworm. Evaluations were conducted in field and the performances were analyzed. The yield traits such as cocoon weight, shell weight, Pupal weight, Silk ratio and Effective Rate of Rearing percentage and the developmental traits such as incubation period, fecundity, hatching period, hatching percentage, larval weight, larval duration, larval survivability was calculated for comparison with values of the ecoraces . The sample size taken was 50 (larvae / cocoons) selected randomly. This study help to quantify the yield parameters of Eri silkworm and find out the major cause for yield gap to make the sector sustainable and economically vibrant among poor villagers of Jagatsinghpur district of Odisha.

Key words: Ericulture, Philosamia ricini , yield traits ,jagatsinghpur

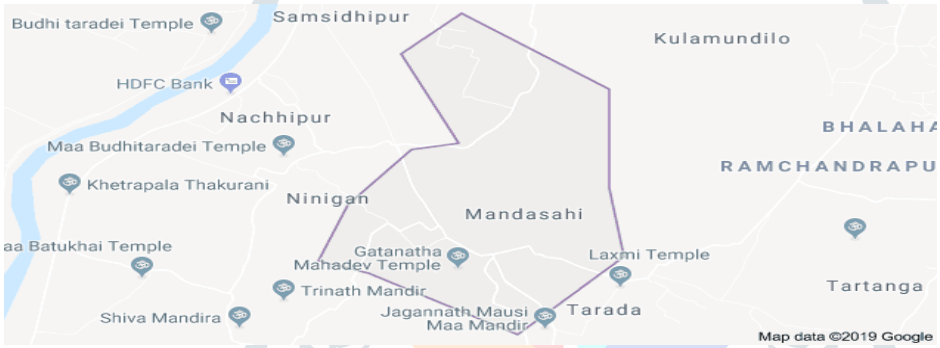
I. INTRODUCTION

Eri culture is carried out traditionally during villager's leisure hours on castor plantations supplemented occasionally by other secondary host plants in case of shortage of leaves. Eri spinning and weaving are done by villagers in the spare time and required fabrics are woven for the family consumption. As such, it is not an organized commercial activity like the culture of mulberry silkworm. For the tribals, the eri pupa is a delicacy and cocoon is a by-product. Since eri cocoons cannot be reeled, its yarn do not fetch a good price and it remained as a subsidiary household practice for the tribal in hills and plains of north-eastern India. In Odisha the eri silk moth rearing was introduced by the erstwhile Bihar-Odisha Government during 1940s, with establishment of an institute at Bhagalpur (Bihar). The market for eri silk in the textile industry is growing day by day. Increased silk production can be a means to earn foreign exchange and contribute lots to our country's economy. Eri silkworm is multi-voltine can be reared indoors in all seasons. But the winter season seems to be the most favorable one in order to produce both qualitative and quantitative eri silk in Odisha. The eri culture is practicing in the state in the smaller scale but presently sericulture department is giving more emphasis for its expansion and as a result the growth is gradually increasing over the year.

II.STUDY AREA

Farmers of Mandasahi village of Jagatsinghpur district were considered as farmers level and Govt. Eri farm of Khurda was considered as Farm level. Mandasahi village is located in India and listed under Taluk: Jagatsinghpur, in the district of Jagatsinghapur, Odisha State.

Geographic location of jagatsinghpur **Geographic location of Khordha , odisha**



Mandasahi village of jagatsinghpur

III. MATERIALS AND METHODS

Phenotypic variation studies for the evaluation of commercially important yield and developmental traits of *P. ricini* were conducted as per the procedures of Jolly et al. (1979). Evaluations were conducted in field and the performances were analyzed. The yield traits (of commercial value) such as cocoon weight, shell weight, Pupal weight, Silk ratio and Effective Rate of Rearing percentage and the developmental traits such as incubation period, fecundity, hatching period, hatching percentage, larval weight, larval duration, larval survivability, percentage of double cocoons, moth emergence percentage and percentage of moth ovi-posited was calculated for comparison with values of the ecoraces. The sample size taken was 50 (larvae / cocoons) selected randomly, which was taken in per season. The phenotypic variation studies of yield traits taken up are as described as below:

Effective rate of rearing (ERR)

The effective rate of rearing was calculated from the number of larva brushed and number cocoon yield using the following expression:

$$ERR\ (\%) = \frac{\text{Nos. of cocoon yield}}{\text{Nos. of larvae brushed}} \times 100$$

Shell ratio

The cocoon weight (with pupa) and cocoon shell weight (without pupa)were recorded individually diet wise and shell ratio was calculated in percentage following Krishnaswami *et al. (1972).*

$$\text{Shell ratio (\%)} = \frac{\text{Weight of the cocoon shell}}{\text{Weight of the whole cocoon}} \times 100$$

Total silk production(TSP)

Similarly the total silk production (TSP) was calculated by multiplying ERR% with shell weight. The experiments were repeated in each season.

TSP= ERR% × shell weight

Incubation period:

It was recorded by calculating the number of days the eggs took to hatch.

Fecundity:

Fecundity was recorded by counting the total number of eggs laidper female during each rearing season.

Hatching percentage:

Hatching percentage of each DFL was recorded by the formula:

Hatching percentage = total number of eggs hatched / total number of eggs laid x100.

Hatching period:

The hatching period was recorded as the total number of days the DFLs took to hatch completely.

Larval weight:

The larval weight was recorded by weighing the fully maturelarva on second day of fifth instar, expressed in gm.

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IV.RESULTS AND DISCUSSION

EFFECTIVE RATE OF REARING% (ERR%)

The highest percentage of ERR was observed during month of rainy season of 92.27%.Then this value decreases in winter season of 91.17%.The lowest value of percentage of ERR was estimated in summer season of 87.80%.

Table1 Matured larval weight of *P. ricini* during various seasons.

Month	Mature larval weight
February-March	6.0-6.5
April-June	6.5-7.0
July –August	7.0-7.5

September-October	7.5-8.0

Table 2 ERR% of *P. ricini* during various seasons

Season	ERR%
Rainy	92.27
Winter	91.17
Summer	87.80

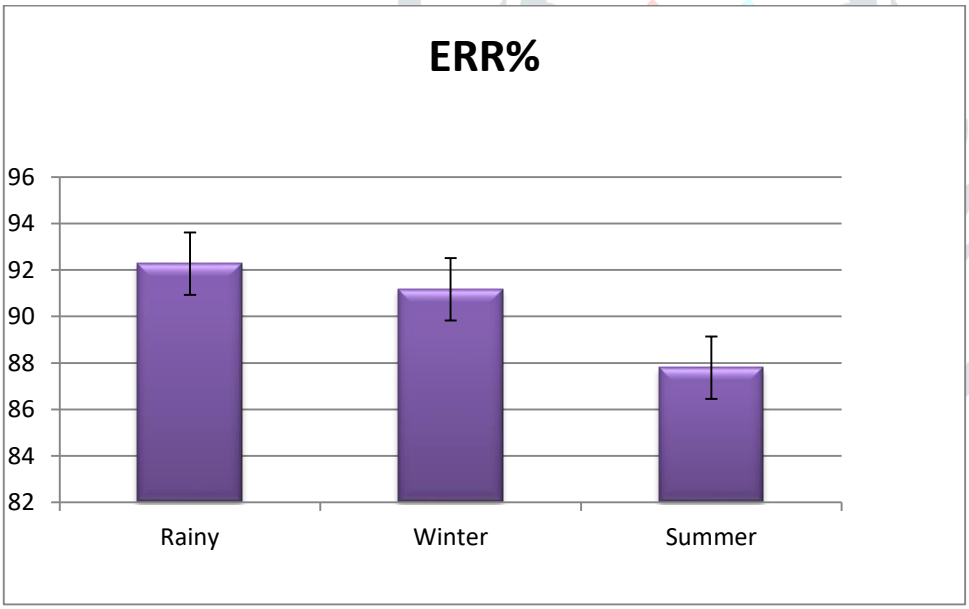

Figure 1 ERR% of *P. ricini* during various seasons.

SHELL RATIO (%)

The shell ratio of Eri cocoon were non-significant except in the month of September-October. During September-October season, the highest shell ratio(%) was estimated 14.48%.The least shell ratio was recorded in the month of July-August of 11.24%.This value slightly increases in the month of January-February of 12.49%.During month of April-June, moderate value of shell ratio was found of 13.34%.

Table 5 Shell ratio of *P. ricini* during various seasons.

Month	Shell ratio(in %)
Jan-Feb	12.49
April-June	13.34
July –August	11.24
Sept-Oct	14.48

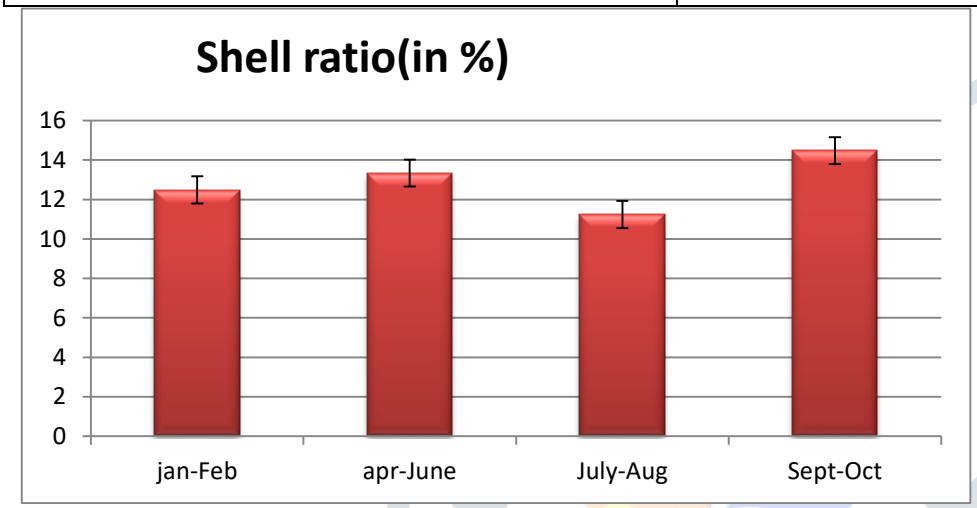

Figure 4 Shell ratio of *P. ricini* during various seasons.

Fecundity (Counted in Number)

The highest value of fecundity was observed during the month of September-October of 280.This value slightly declines to 260 in the month of April-June. The least value was estimated in the month of November-December of 220.This value remains moderately to 240 in the month of January-February.

Table 9 Fecundity of *P. ricini* during various seasons.

Month	Fecundity
Jan-Feb	240
April-June	260
Sept –oct	280
Nov-Dec	220

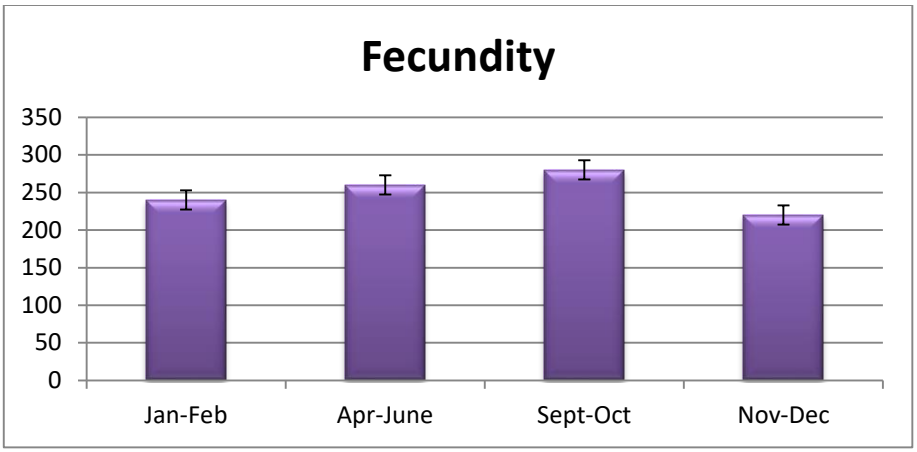

Figure 7 Fecundity of *P. ricini* during various seasons.

HATCHING(in %)

The highest value of percentage of hatching was observed during the month of September-October of 92%.This value slightly declines to 88% in the month of June-July. The least value was estimated in the month of November-December of 76%.This value remains moderately to 84% in the month of January-February.

Table 10 Hatching(in%) of *P. ricini* during various seasons.

Month	Hatching(in %)
Jan-Feb	84
June-July	88
Sept –Oct	92
Nov-Dec	76

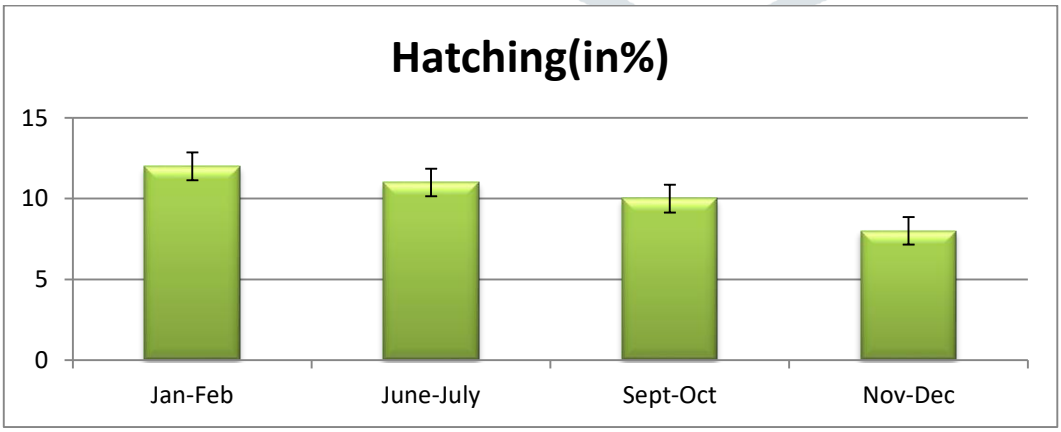

Figure 8 Hatching of *P. ricini* during various seasons.

INCUBATION PERIOD (In Days)

The incubation period was found highest of 12 days in the month of January-February. The moderate incubation period was recorded of 10 days in the month of September-October. This value slightly more to 11 days in the month of June-July. The least value of incubation period was estimated to 8 days in the month of November-December.

HATCHING PERIOD(Days)

The average period of hatching lies to 8days.

Table12 Incubation periods of *P. ricini* during various seasons.

Month	Incubation period(in days)
Jan-Feb	12
June-July	11
Sept –Oct	10
Nov-Dec	8

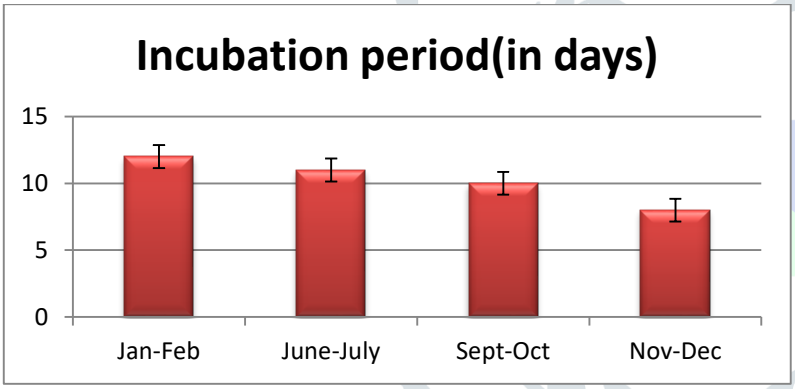

Figure 10 Incubation periods of *P. ricini* during various seasons.

MATURED LARVAL WEIGHT

The lowest mature larval weight was recorded in the month of February-March ranging from 6.0-6.5gm.The weight of mature larva increases slightly in the month of April-June of 6.5-7.0gm.In the month of July –August the weight further increases ranging 7.0-7.5gm.The highest mature larval weight was recorded in the month of September-October of 7.5-8.0gm.

Table1 Matured larval weight of *P. ricini* during various seasons.

Month	Mature larval weight
February-March	6.0-6.5
April-June	6.5-7.0
July –August	7.0-7.5

September-October	7.5-8.0

Sericulture in Odisha is capable of providing a strong support for under privileged people as dependable and additional avenues of income at frequent intervals. Tribes and poor can accept sericulture as subsidiary occupation for their economic gain. Hence horizontal and vertical expansion and development is highly necessary by replacement of low yielding local variety with high yielding variety (HYV) host plants, percolation of improved technologies by organizing Training, Seminars, Demonstration or Awareness programmes, special emphasis to be given on awareness about prophylactic measures to prevent diseases, Audio-visual programmes for mass awareness on disease management, development of region wise, district wise disease and pest forewarning calendar, demonstration programme for transfer of technology, skill development programmes for staff in Pre and Post cocoon sector, stress to be given to persuade farmers to use separate ideal rearing house close to castor garden as for as practicable, effective utilization of rearer force to check unemployment, organized plantation of host plants, mixed plantation of mulberry and castor, training of farmers to motivate to undertake sericulture on commercial lines and creation of market Linkages.

V.REFERENCES

[1] Ray, P. P., Rao, T. V. and Dash, P. 2010. Performance of promising ecoraces of Eri (Philosamia ricini) in agroclimatic conditions of Western Odisha. The Bioscan. 5(2): 201-205.

[2] Kar, J. 2004. Survey on Eri Resources of Orissa. Final Report of Directorate of Textiles, Orissa. pp. 45-48.

[3] Jolly, M. S., Sen, S. K., Sonwalker, T. N. and Prasad, G. K. 1979. Non-mulberry silks, FAO Manual on Sericulture, Food and Agriculture Organization of the United Nations, Rome. p. 178.

[4] Kumar, R. and Elangovan, V. 2010. Rearing Performance of Eri Silkworm in Monsoon Season of Uttar Pradesh. Asian J. Biol. Scis. 1(2): 303-310.

[5] Lakshman,S.2007.Yield Gap in Mulberry Sericulture in Karnataka: An Econometric Analysis .Ind. Jn.of Agri. Econ. Vol.62,No.4 ,Oct.-Dec. 2007

[6] Hota, M. M., Pati, P. K., Pradhan, K. C. and Sharma, M. 2005. Ericulture in Orissa Potential Exists. Ind. Silk. 44: 12-13.

[7] Vijaya Prakash, N.B. and S.B. Dandin (2005a), "Yield Gaps and Constraints in Bivoltine Cocoon Production in Mandya District of Karnataka- An Economic Analysis", *Indian Journal ofSericulture*, Vol.44, No.1, pp. 50-54

[8] Bhatia,N.K., Yousuf,M., Nautiyal,R. Yield Gap Analysis of Mulberry Sericulture in Northwest India .Int. J. Indust. Entomol. 27(1) 131-141 (2013)

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