Studies On Impact of Different Food Plants Available in Saran District of Bihar on Eri Silkworm *(*Samia Ricinii*)*

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***Abstract*—Bihar is a non- traditional state of India for silk production while some Districts like Bhagalpur, Banka, Nawada, Muzaffarpur, Hajipur, Begusarai are familiar for it. But saran district is still not familiar with sericulture while tremendous potential for rearing of silkworm is available here but it is unexplored. Among the silk producing species the Mulberry silkworm *(Bombyx mori)*, *Tasar* silkworm *(Antheraea proyeli)*, Munga *(Antheraea assamensis)* and Eri silkworm (*Samia ricinii)*. Larvae of Eri silkworm is Polyphagous because it consumes various types of plants as their food. Present experiment has conducted in premises of Zila school, Chapra, Saran to analyse the impact of some alternative food plants available in saran District of Bihar on Eri Silkworm *(Samia ricinii*). The plants used in the study have been collected from the school premises as well as nearby area. DLF(Eggs) of Eri silkworm have collected from Andi Resham Farm, Begusarai. Castor *(Ricinus communis)*, papaya *(Carica papaya)*, Maize *(Zea mays)*, Banana *(Musa paradisiaca)* and ailanthus *(Ailanthus altissima)* have selected to supply larvae of Eri silkworm to feed. Castor is followed by papaya and Ailanthus. Maize is eaten by larvae but not survive longer on them same result has been found on banana.**

***Index Terms*—Silkworm, Eri silkworm, Food plants, Zila school chapra. Saran, polyphagus.**

I. INTRODUCTION

Sericulture is an agro-based cottage industry and is capable of providing employment at various level like agriculture and industries. It provides employment to the people in the form of cultivation of host plants of silkworms, rearing of silkworms, reeling and spinning of threads, textile weaving textile on industry level. It can improve the livelihood of people as well as the economy of state and country. Bihar is a non-traditional state of India for silk production. While some districts of Bihar are familiar for silk production, because of the production of silk fabric Bhagalpur is also known as silk city. Begusarai district has an Andi Resham Farm where Eri silkworm rearing is in practice. Silkworm also reared in some other district of Bihar like Banka, Nawada, Muzaffarpur, Hazipur(Vaisali) etc.But Saran district is till now not familiar with silkworm rearing and silk production while Saran district of Bihar has tremendous potential for silkworm rearing but yet unexplored. Among the silk producing species of insects the mulberry silk worm *(Bombyx mori Linn)*,Tasar silkworm *(Antheraea proyeli Jolly*), Munga silkworm *(Antheraea assamensis)* Eri- silkworm *(samiaricini)* are produce silk which utilize for human welfare. Among them larvae of Eri silkworm (Samia ricini) known as polyphagous due to their nature of consumption various types of plants as their food. On the basis of various studies by different researchers host plant of Eri-silkworm (Samia ricini) have been classified as primary, secondary and tertiary on the basis of degree of their acceptance.Different Food pants can have a significant effect on the yield and quality of eri-silkworm like the cocoon's weight, shell's weight, shell ratio. The larval duration of Eri-silkworm is an important factor to reduce labour costs and requirement of leaves of hot plants. It is also affected by the quality of their food and types of host plant as well as environmental conditions. Present study is an attempt to analyse the impact of some alternative food plants available in Saran district of Bihar on Eri-silkworm.

II. MATERIAL AND METHODS

Experiment has been conducted in the premises of Zila school, Chapra, Saran, Bihar. The plants used in the study have been collected from the school premises as well as nearby area. Castor *(Ricinus communis)*, papaya *(Carica papaya)*, Maize *(Zea mays)*, Banana

(Musa paradisiaca) and ailanthus *(Ailanthus altissima)* have been selected to supply larvae of Eri silkworm to feed. The castor (Samia ricini) plant has been used as primary /mother plants to control the growth and development of larvae of Eri silkworm. Before initiation of rearing all equipment and rearing room have been properly cleaned and disinfected with 2% alcohol. Bleaching powder have been also used to disinfect nearby area of rearing room. DFls (Disease free layings) or eggs of Eri silkworm have collected from Andi Resham Farm, Begusarai district of Bihar during last October 2024. Eggs were disinfected with 2% of alcohol to avoid any type of infection. The eggs were incubated at room temperature. Room temperature has been maintained by using room heater and 100watts bulb to avoid extreme cold. Hatching start after 4 to 5 days. After hatching one layer of tender leaves of selected plants were spread over the eggs. tender leaves of selected plants were supplied to larvae newly hatched worm crawl on the under surface of leaves. The leaves along with larvae were transferred to the separate feeding trays containing leaves of different host plants and turn the lower surface of leaves upward. The tender to semimature leaves of different selected plants were supplied 2 to 3 times a day in different trays up to 3rd larval stage. During the 4th to 5th instar mature leaves were supplied three to four times every day to feed the larvae. Data have been recorded to analyse the responses of larvae. Following formulae have been used

$$(1).\ \text{Approximate digestivility (\%)} = \frac{\text{weight of food offered}}{\text{Weight of Food ingested}} \times 100$$

$$(2).\ \%\ \text{mortality} = \frac{\text{Number of worm dead}}{\text{Total number of worm taken.}} \times 100$$

Fig (1) Ailanthus altissima

Fig (2) Zea mays

Fig (3) Musa paradisiaca Linn

Fig (4) Carica papaya L.

Fig (5) Ricinus communis

The available plants which are selected for studies are

Sl no	Common nameof plants	Biological name of plants	Family	Character of leaf
1	castor	*Ricinus communis*	Euphorbiaceae	Glossy, Thick, Palmatly
2	Maize	*Zea mays*	Poaceae	Linear, Parallel vein
3	Papaya	*Carica papaya L.*	Caricaceae	rough green, pliable, Palmately
4	Banana	*Musa paradisiaca Linn*.	Musaceae	Smooth, glossy, waxy, flexible
5	Ailanthus	*Ailanthus altissima*	Simaroubaceae	Large, Deciduous, pinnately compound

Fig (6)- Eggs

Fig (7)-Just hatched larvae

Fig (8)-2nd instar

Fig (9)- 3rd instar

Fig (10)- 4thinstar

Fig (11)- 5th instar

Fig (12) Cocoons

Fig (13) feeding on different plants

III. RESULT AND DISCUSSION

The quality of leaf has got a direct influence on health, growth and survival of silkworm. The variation in nutrient constituents in host plant may be due to the types of the leaves and the effect of environmental factors.Thus it is inferred that there is an inter relation between the nutritional constituents of the host plant leaves and economic characters of silkworm depend on Climatic factors (Th. Aruna singha,2015).

On the basis of result of the various invesigation carried out by different investigators slightly longer larval period was observed due to lower temperatur,The shape,size and colour of Eri-silkworm's cocoon vary according to the used host plants.Dulumani Das (2015) also studied on rearing of Eri-silkworm*(Philosamia ricini Hutt.)* on Tapioca *(Manihot utilisima)* during Autumn season in Assam, found that Tapioca can be used as primary food plant of Eri-silkworm ..

Md.Akib Husain and Shehnaz Siddika Rasid (2024) have concluded in their study on Exploring the impact of food plants on the life cycle of Saia ricini; that independent feeding on Castor plant resulted a shorter life cycle duration in Eri-silkworm *(Samia ricini Donovan)* compared to interchanging feeding with Gamri *(Gmelina arborea*) and Papaya *(Carica papaya)* plants.In present study it have been found that the larvae which feed on Castor *(Ricinus communis*) start forming cocoon in shorter period compared to those larvae which feed on papaya *(Carica papaya L.*) and ailanthus *(Ailanthus altissima).*

Achieving higher larval weight can be a sign of effective resource or food utilization which contribute to the better silk production efficiency by the silkworm. In present study it have been founded that performance of fourth and fifth instar larvae of Eri-silkworm on Different available food plants in Saran district of Bihar larvae preferred castor followed by Ailanthus and Papaya. banana and maize not well accepted by them.

Weight of different larval stage after feeding on different food plants during Nov to Jan 2024 is mentioned in the table.

plants	1st instar wt (gm)	2ndinstar wt (gm)	3rd instar wt (gm)	4th instar wt (gm)	5thinstar wt (gm)	Mature wt (gm)
Ricinus communis	0.018	0.47	1.43	3.49	8.78	7.38
Zea mays	0.003	0.020	0.00	0.00	0.00	Not survive
Carica papaya L.	0.015	0.46	1.25	2.65	4.95	3.76
Musa paradisiaca Linn.	0.004	0.018	0.00	0.00	0.00	Not survive
Ailanthus altissima	0.013	0.36	1.12	3.05	7.85	6.53

IV. CONCLUSION

Based on the present studies it has been concluded that among host plants available in Saran district of Bihar, Castor is very suitable for Eri-silkworm. Castor is followed by Ailanthus and Papaya. The leaves of the maize plant are eaten by the larvae of Eri silkworm but they could not survive longer same result have been found on Banana plant. So Eri-silkworm can be reared on Castor in Saran district of Bihar and Ailanthus and Papaya can be used as secondary host plants during scarcity of Castor. Maize and banana are not suitableforlarvae of Eri-silkwormin Saran district of Bihar.

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