

Study on the Response of Eri Silkworm on Cauliflower (*Brassica Oleracea Var. Botrytis*) Plants in Saran District of Bihar

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ABSTRACT:

Out of all four varieties of silkworms, only the mulberry (*Bombyx mori*) and Eri-silkworm (*Samia ricini*) can be reared indoor while Tasar (*Antheraea mylitta*) and Munga (*Antheraea assamensis*) are wild in nature. The Eri-silkworm (*Samia ricini*) is traditionally reared on Castor (*Ricinus communis*) and Tapioca (*Manihot esculenta*) leaves. However alternative host plants are being explored to improve silkworm production and sustainability. The present study investigates the response of Eri silkworm on Cauliflower (*Brassica oleracea var. botrytis*) plants in Saran district of Bihar. The experiments have been conducted in the premises of Zila school, Chapra, Bihar. DFL (eggs) were collected from Andi Resham Farm, Begusarai District of Bihar. 5% Formaldehyde used to wash eggs to remove gummy excretal substance and 2% Formaline used to avoid any infection. bleaching powder used to disinfect rearing room and its surrounding. The research assesses the response of this alternative diet on larval growth, cocoon quality, silk yield compared to traditional host plants. Parameter such as larval weight, Survival rate, pupation period and cocoon weight were analyzed to determine the suitability of Cauliflower (*Brassica oleracea var. botrytis*) plants for Eri-Silkworm. Preliminary findings suggest that while cauliflower leaves can sustain Eri-Silkworm, variations in growth, performance and silk qualities were observed. The results provide insight into the potential of Cauliflower (*Brassica oleracea var. botrytis*) as a supplementary or alternative food for Eri-Silkworm (*Samia ricini*) rearing in Saran District of Bihar contributing to sericulture diversification and rural economic development.

Keywords: Eri-Silkworm, Cauliflower, Silk production, Alternative food plants, Saran District, Bihar.

Introduction

The term “Eri” is derived from the Sanskrit word ‘Eranda’ that means Castor as it is primary host plant of Eri-Silkworm. Out of all varieties of silkworm Eri-Silkworm (*Samia ricini*) is a polyphagous and feeds on the leaves of many plants. Castor (*Ricinus communis*) leaves serve as chief food for rearing of Eri-silkworm, but some other plants can also be used to feed them. Present study revealed that cauliflower (*Brassica oleracea var botrytis*) can be also used as food plant for Eri-silkworm during winter season. Saran District of Bihar has demonstrated potential for castor cultivation due to its favorable climatic and soil conditions. availability of agricultural labour and traditional agricultural knowledge provide a foundation for introducing sericulture as an alternative livelihood option. The present study investigates the response of Eri-Silkworm on Cauliflower (*Brassica oleracea var. botrytis*) plants in Saran District of

Bihar, India, in comparison to Castor (*Ricinus communis*) as it is traditional primary host plant for Eri-Silkworm rearing served as the control in this experiment. Cauliflower (*Brassica oleracea var. botrytis*) is one of the vegetable cultivated as seasonal plant, it grows best in moderate day time temperature 21° - 29°C, with plentiful sun and moist soil condition, high in organic matter and sandy soil, leaves are a good source of vitamins, mineral and antioxidant.

The larvae started feeding immediately. when fed it is noticed that, the growth was faster in castor as compared to the papaya and mixed feeding with castor and papaya (Camble, P.L, Jadhav, A.D 2019).

As mentioned by Shivani A Pankar and Deepak T. Barnare (2018) in their research paper According to National Institution of nutrition, Hyderabad, India, the nutritional composition of Cauliflower leaves per 100 g it contains protein-5.9 g, fat-1.3 g, carbohydrate- 6.6 g, crude fiber - 2 g, β - carotene - 49.52g , Iron -14 mg, energy – 66 cal.

In The Book “Eri - culture, Rearing of Ahimsa Silk” published by B S Publications, Hyderabad, and Author is V. Lakshmi Narayanamma. Cauliflower is listed as alternative food plants for rearing of Eri-silkworm. So cauliflower have been selected for this study.

Material and Methods:

The present study to find out the response of Eri-silkworm (*Samia ricini*) on the leaves of Cauliflower (*Brassica oleracea var. botrytis*) in Saran District of Bihar, India, was conducted in premises of Zila school, Chapra, Bihar, India. During the two consecutive years (2023 - 2024). Castor and Cauliflower (*Brassica oleracea var. botrytis*) grown in the campus of Zila school Chapra, Bihar. DFL (eggs) were collected from **Andi Resham Farm, Begusarai district of Bihar**, India, During Nov 2023 and 2024. Plastic tray and corrugated boxes were used as feeding trays. Formaldehyde, Bleaching powder and 2% Formalin were used as disinfectant to avoid any type of infections like bacterial and fungal. Before rearing of silkworm rearing room and all apparatus which will be used in rearing should be properly washed and disinfected by 5% formaldehyde. Bleaching powder spread surrounding the rearing room. 5% formaldehyde used to wash eggs to remove gummy excretal substance and 2% formalin used to avoid any infection.

Muslin cloth was used to cover the rearing trays to prevent larval escape while allowing adequate ventilation feeding trays or frames covered with nylone net were used during molting periods to provide support for the molting larvae while preventing disturbance from newly offered leaves.

DFL (eggs) were covered with tender leaves of Cauliflower (*Brassica oleracea var. botrytis*) and Castor (*Ricinus communis*) in separate trays. After hatching tiny worm like larvae of blackish colour were crawled under the leaves. 1st and 2nd instar of larvae provides tender and chopped leaves. To 3rd instar larvae semi tender leaves were supplied twice daily and for 4th to 5th instar larvae semi mature and matured leaves were provided twice daily for 6 to 7 days.

The research assesses the response of the alternative diet on larval growth, Cocoon quality, Silk gland, Silk yield compare to traditional host plants. Parameter such as Larval weight, Survival rate, Pupation period, Cocoon weight, ERR%, Hatching %, Shell weight, Shell Ratio.

Result and Discussion:

The experimental finding from this investigation revealed significant variation in Eri-Silkworm performance on Cauliflower compared to the traditional host plants i.e Castor (*Ricinus communis*).

Detail analysis of stage wise mortality revealed interesting pattern. The mortality was generally highest during the early instars (first and second) followed by the fifth instar while the middle instars (third and fourth) showed relatively lower mortality rate. This pattern was consistent for castor and cauliflower. Stage-wise mortality(%) of larvae of Eri Silkworm on different food plant.

Larval stage	Castor	Cauliflower
1 st instar	3.2	6.2
2 nd instar	2.4	4.9
3 rd instar	1.3	3.0
4 th instar	0.7	2.4
5 th instar	2.8	5.3

Survivability percentage of different larval stages on Castor (*Ricinus communis*) and Cauliflower (*Brassica oleracea* var. *botrytis*).

Larval stage	Castor	cauliflower
1 st instar	99.8	93.9
2 nd instar	99.4	95.1
3 rd instar	99.6	97.0
4 th instar	99.4	97.2
5 th instar	99.9	94.2

Reproductive parameters including fecundity (number of eggs laid Per female), Fertility (percentage of fertile eggs), and egg hatching percentage were also analysed.

Biological characteristics of Eri-silkworm reared on Cauliflower and Castor in Saran, District of Bihar.

Sl no.	Parameter	Castor	Cauliflower
1	Hatching percentage (%)	96.8	94.2
2	Larval growth rate (g/day)	0.96	0.77
3	Duration of fifth instar (day)	7.3	8.9
4	Cocoon formation time (day)	2.5	3.2
5	Pupal period (day)	12.3	13.1
6	Fecundity (eggs/female)	372	229
7	Fertility (%)	94.8	79.2

Analysis of variance key parameter of Eri-silkworm on castor and Cauliflower.

Parameter	Castor	Cauliflower
Larval weight (g)	8.12	6.48
Larval duration (days)	21.3	24.7
ERR (%)	89.6	73.9
Cocoon weight (g)	4.05	3.21
Shell weight (g)	0.52	0.38

Shell Ratio (%)	12.8	11.8
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Fig;- feeds on castor's leaves



Fig: - feeds on Cauliflower's leaves

Conclusion

On the basis of analysis of different parameter such as Larval, Survival rate, Pupation period, Cocoon weight, ERR%, Shell Weight, Shell ratio(%) Hatching%, Fecundity, Fertility, Survivability, and Mortality it have been revealed that the cauliflower (*Brassica oleracea* var. botrytis) have potential to use as a alternative food for Eri-Silkworm (*Samia ricini*) in Saran District of Bihar, India. It can be play an important role in to increase income of farmers and strength of Economy of District, State as well as country.

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