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IMPACT OF VARIETAL FEEDING ON SAMIA RICINI DONOVAN IN SPRING AND AUTUMN SEASON OF UTTAR PRADESH

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ABSTRACT

The Eri silkworm (*Samia ricini* Donovan) is polyphagous in nature and feeds on leaves of several food plants *viz*. Castor (*Ricinus communis*), Tapioca (*Manihot esculenta*), Barara (*Jatropha curcas*), and Papaya (*Carica papaya*). It is multivoltine in nature and reared in indoor conditions. We observed the effect of different food plants in relation to the seasons on the larval growth and its economic characters by conducting rearing as per standard rearing techniques. The evaluation of data revealed that castor food plants have shown supremacy over the other food plants, i.e., Tapioca, Barera & Papaya for larval growth as well as economic characters. The data showed that minimum larval duration (days) in spring season (19.0) ERR % (91) SR % (14.55) and other economic characters showed better in the spring season.

Keywords: Eri silkworm, cocoon, larva, pupa, growth.

INTRODUCTION

Sericulture is practiced in India in more than 60000 village involving around 8 lack families, There is earning of foreign exchange 3200 crore per annum. There are four types of silk which are commercially exploited in India. They are mulberry, Tasar, Eri, and Muga. The production of silk in India during 2006 - 2007 was recorded to the tune of 18475 MT, out of 18475 MT, The mulberry silk production was 16525 MT, Tasar 350 MT, Eri 1485 MT, ans Muga 115 MT. India is the largest producer of Eri silk in the world as 96% of Eri silk is produced in India of the total eri silk produced in the world. The eri silk worm feeds on leaves of many food plants Castor, Kessaree, Tapioca, Barkesseru, Payam, Barpat Jatropha, Papaya, Ailanthus altissima, Gulanch, Gamari etc. All the food plants are not equally good for eri silkworm rearing and eri silkworm show different behavior, when reared on different food plants. No such studies were taken earlier in Uttar Pradesh. Hence screening of the best food plants is required .Accordingly present study has been conducted to screen out best food plants and best season for rearing in Uttar Pradesh climatic conditions.

MATERIALS AND METHODS

This study was conducted at Babasaheb Bhimrao Ambedkar University, Lucknow by rearing of Eri silkworm on the leaves of castor, tapioca, jatropha, papaya, which are maintained in university campus with uniform culture operation. The rearing was undertaken as per the standred rearing techniques. The temperature and humidity range was in between 25^{o}C - 28^{o}C and 70% - 80%, respectively. Disease fee laying (eggs) of eri silkmoth having uniform fecundity were reared. The egg incubation and rearing was undertaken as per the recommended method of Choudhury (1982). For each host plant species three replications were undertaken having one disease free laying in one replication. The host plant species were local variety of Caster and Tapioca, Barera and Papaya. Tender leaves were fed four times a day up to III instar and semi tender and mature leaves were fed five times a day to the IV and V instars, respectively. Bamboo chandrika were used as mountage during spinning of cocoon by the larva. Harvest was made on the sixth day of spinning. Mean weight ± S.ED of cocoon, pupa and shell was recorded using Mettler balance. Effective rate of rearing (ERR %) and shell ratio (SR %) were calculated.

RESULTS AND DISCUSSIONS

The data for Larval duration, larval weight, ERR%, Pupation % and fecundity No., Cocoon weight, Pupae weight, and shell weight were recorded. The SR% was also calculated. The a biotic factors *viz.* maximum, minimum temperature, Relative humidity and No of rainy days were also recorded for rearing period. Observations are presented in Tables 1 and 2.

The data reveals that larval duration (days) in autumn and spring season was recorded minimum in castor plant (20.00 and 19.00), followed by tapioca (21.12 and 21.00), Barera (22.00 and 22.12), and maximum recorded in the case of papaya (24.00 and 23.00) respectively. Similarly larval weight (g) was recorded maximum in castor plant (7.45 and 7.60) followed by tapioca (6.82 and 6.80), Barera (6.05 and 6.25) and minimum (5.35 and 5.65) in case of papaya food plant. The observed ERR (%) of castor plants was maximum (86.0 and 90.0) followed by Tapioca (80.0 and 88.0), Barera (78.0 and 85.0) and papaya showed minimum ERR (75.0 and 76.0). The pupation percentage (%) was maximum recorded in castor plant (88.0 and 90.0) followed by Tapioca (77.0 and 82.0), Barera (74.0 and 75.0) and minimum (68.0 and 70.0) in case of Papaya respectively. Likewise, in autumn and spring season the cocoon weight (g) was recorded maximum in castor plant (3.56 and 3.62) followed by Tapioca (3.25 and 3.22), Barera (2.95 and 3.20) and minimum (2.80 and 3.00) in case of Papaya respectively. The pupae weight (g) was recorded maximum in castor (3.12 and 3.10) followed by Tapioca (2.75 and 2.78), Barera (2.45 and 2.50) and minimum (2.43 and 2.30) in case of papaya food plant.

The shell weight (g) was recorded maximum in castor (0.52 and 0.55) followed by Tapioca (0.46 and 0.44), Barera 0.42 and 0.40) and minimum (0.38 and 0.36) in case of Papaya food plant.

The shell ratio % was calculated and found maximum in Castor (14.58 and 15.19) followed by Tapioca (14.15 and 13.66), Barera (13.55 and 12.50) and minimum (13.54 and 12.00) in case of papaya plant respectively. A biotic factor is presented in Table-2.

On the basis of results obtained we can say that our findings as in resemblances to the findings of other Scientists of different part of the country. The food plant of different species influences the larval growth, larval duration, cocoon weight, pupal weight, shell weight, S.R. %, ERR% and fecundity. The effect of host plant species on the growth and development in the insects has been reported (Reddy *el al.*, 1989, Muthukrishnan and Pandian, 1987 and Maribashetty *et al*., 1999). larval duration, cocoon weight, pupal weight, shell weight, S.R. %, ERR% were higher in eri silkworm fed with caster in spring season, which are 19.00, 3.62, 3.10, 15.19, 90.0% higher respectively in comparison the other food plants. The observed higher percentage of larval weight, cocoon and pupal weight and SR% exhibited by eri silkworm fed on castor leaf may be due to the higher rate of food ingestion, food assimilation and respiratory activity, The involvement of these factors in increasing the larval body substance has been reported by Hiratsuka (1920) in *Bombyx mori*, later by Stockner (1971) in *Philosamia ricini* Hutt. and Dey (1983) in *Anthcraea proylei*. Moreover the percentage of water content of host plant leaf also might influence the larval body weight Waldbaur (1968); Delvi (1983); Naik and Delvi (1984), Delvi and Naik (1984); Naik (1985); Delvi *et al*., (1988) and Muthukrishnan and Pandian (1987) reported that insects could accumulate water from the metabolic food. However, Maribashetty *et al.*, (1999) reported that in silkworm *B. mori* the food consumption has a direct influence on the weight of larvae, cocoon and shell.

From these results it is obvious that the performance of eri silkworm was better on *ricinus communis* food plant which showed significant increase in the larval weight, silk gland weight, cocoon weight and the shell weight considerably followed by other food plants in spring season of Uttar Pradesh.

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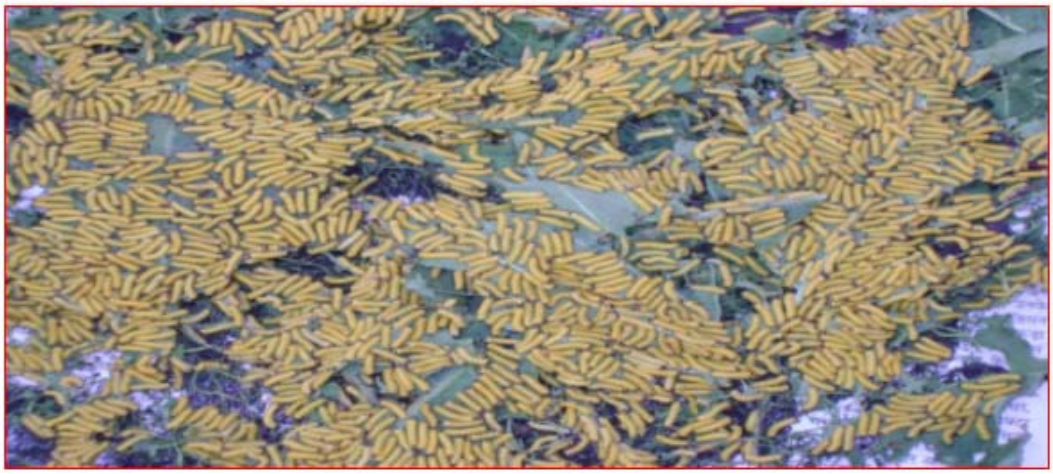
Table-1. Economic parameters of Eri silkworm reared on different food plants in autumn and spring season.

Parameters	Food plants				Gain over minimum performer (%)	S.E (±)	C.D. 5 %	C.D. 1 %
	Caster	Tapioca	Barera	Papaya				
Autumn season								
Larval duration (days. hr)	20.0	21.12	22.0	24.0	16.66	0.351	0.710	1.082
Larval weight (g)	7.45	6.82	6.05	5.35	28.18	0.091	0.201	0.312
ERR %	86.0	80.0	78.0	75.0	12.79	0.701	1.412	1.941
Pupation %	88.0	77.0	74.0	68.0	22.72	2.451	5.942	6.524
Cocoon weight (g)	3.56	3.25	2.95	2.80	21.34	0.60	0.178	0.192
Pupae weight (g)	3.12	2.75	2.45	2.43	21.47	0.003	0.007	0.011
Shell weight (g)	0.52	0.46	0.42	0.38	26.92	0.018	0.051	0.074
Shell %	14.58	14.15	13.55	13.54	6.92	0.232	0.714	0.885
Spring season								
Larval duration (days)	19.00	21.00	22.12	23.00	17.39	0.312	0.673	0.912
Larval weight (g)	7.60	6.80	6.25	6.65	25.65	0.172	0.375	0.534
ERR %	90.0	88.0	85.0	76.0	15.55	0.751	1.512	1.982
Pupation%	90.0	82.0	75.0	70.0	20.45	1.525	3.564	4.245
Cocoon weight (g)	3.62	3.22	3.20	3.00	17.12	0.392	0.128	0.172
Pupae weight (g)	3.10	2.71	2.50	2.30	25.80	0.004	0.009	0.013
Shell weight (g)	0.55	0.44	0.40	0.36	36.54	0.015	0.041	0.064
Shell %	15.19	13.66	12.50	12.00	21.00	0.212	0.623	0.825

Table-2. A biotic factors of rearing during autumn and spring season.

Seasons	Temperature		Relative humidity		Rainy days
	Maximum	Minimum	Maximum	Minimum	
Autumn Sep- Oct 2006	30.0	23.00	96.00	70.00	2
Spring Feb-March 2007	31.00	25.00	94.0	75.00	Nil



1st stage larvae

2nd stage larvae

3rd stage larvae

4th stage larvae

5th stage larvae

Eri Cocoons