



Rearing of Eri Silkworms (*Philosamia ricini* Hutt.) on Tapioca (*Manihot utilisima*) during Autumn season in Assam

KEYWORDS

Eri silkworms, *Philosamia ricini*, Tapioca, food plants, DELs

Dulumani Das

Govt. Eri Seed Grainage, Rongagora Golaghat-785611 Assam

ABSTRACT *Tapioca (Philosamia ricini Hutt.) is a secondary food plant of eri silkworms (Manihot utilisima), which is generally used during the period of shortage of the primary food plants. An experiment was carried out to rear the eri silkworms on the leaves of Tapioca as the primary food plants during autumn season in Assam. After successful conduction of rearing, it was found that Tapioca could be used as a potential host plant of Eri silkworms. The larval period were found 3.5±0.53, 2.4±0.49, 4.5±0.53, 6.6±0.52 and 8±0.71 days for 1st instar, 2nd instar, 3rd instar, 4th instar and 5th instar larvae respectively. The weight of the matured 5th instar larvae, silk gland, single cocoon and shell, shell ratio percentage, Effective Rate of Rearing (ERR), period of pupation and number of DFLs produced were found 6.46±0.35, 0.57±0.03, 2.63±0.64, 0.31±0.15, 11.87±0.35, 90%, 17.1±1.1 days and 370 Nos. respectively. The cocoons harvested were found white to creamy white in colour and elongated to spindle in shape.*

Introduction

Eri Silkworms (*Philosamia ricini* Hutt) is a multivoltine, polyphagous, sericigenous insect, which is largely reared by the silkworm rearers of Northeastern region of India. This region has unique distinction in the world being the only producer of all the commercial varieties of silks. Sericulture being the agro based rural industry it remains closely linked with the culture of the Northeastern region since time immemorial and the traditional subsidiary occupation of the people of this region. It is prevalent mainly amongst the indigenous tribal people of the Northeastern region. But eri culture in this region is practiced in an unorganized manner. The region shares about more than 95% of the total eri silk produced in the world. Bulk of eri yarn and fabric is produced mainly in the Lower Brahmaputra Valley of Assam. More than 50% of the total eri yarn of India is produced by Assam alone. Eri silkworm feeds on a variety of host plants. Castor (*Ricinus communis*) and Kesseru (*Heteropanax fragrans*) are considered as the primary food plants where as Tapioca (*Manihot utilisima*), Jatropa (*Jatropha curcus*), papaya (*Carica papaya*), Borpat (*Ailanthus grandis*) and Payam (*Evodia fraxinifolia*) are the secondary food plants of eri silkworm (Chowdhury 2006, Singh & Das 2006). The eri culture can be conducted through out the year in the areas where it is practiced traditionally as the castor plants are abundant in those areas (Siddique 2009). The growth, development and economic characteristics of eri silkworm are generally influenced to a great extent by a variety of food plants and nutritive contents of the foliage (Singh & Das 2006). Eri silkworm shows different rearing behaviour when reared on different food plants (Kumar & Gangwar 2010). The larval growth rate and rearing performance of eri silkworm have also been studied extensively. The volumetric attributes of eri silkworm reared on different host plants were assessed by Kumar & Elangovan (2010). Thus the present study was carried out to find out the effect of Tapioca on different growth parameters and potentiality of tapioca for rearing of eri silkworm during autumn season in Assam.

Materials and Methods

20 DELs or Disease Free Layings (containing about 250 to 300 eggs/DFLs) of eri silkworm (*Philosamia ricini* Hutt.) were brought from Kapahtoli in Nagaon district of Assam during October, 2014. The eggs were incubated at

the normal room temperature. Hatching took place after 7 to 9 days of egg laying. Tender to semi mature leaves of Tapioca were fed to the silkworm 2 to 3 times a day up to 3rd instar. The late instar larvae were fed with mature leaves of tapioca four times a day. The fully matured and ripe worms were collected and put in the jail for spinning cocoons. The cocoon harvesting was done on the 6th day of spinning and kept in a cool and dry place for egg (DELs) production. The moth emergence took place after 16 to 19 days. The emergence of moth took place in the morning and continued till noon. The female moth were tied to *kharikas* with cotton thread for coupling and kept for 8-9 hours in a dark place. The next morning the pairs were decoupled and *kharikas* with the female moths were kept hanging 6-8 inches apart for laying eggs. The larval duration, weight of fully matured 5th instar larvae, weight of silk gland and different cocoon characteristics like colour, shape, single cocoon weight, shell ratio, effective rate of rearing (ERR), period of pupation and number of DFLs produced were recorded. Colour and shape of the cocoons were evaluated visually as per I.S. method (2939-1964). Separate performa were prepared to evaluate the colour and shape of the cocoons.

The shell ratio and ERR% were calculated by following formulae:

$$\text{Shell ratio} = \frac{\text{weight of shell}}{\text{weight of cocoon}} \times 100$$

$$\text{ERR(\%)} = \frac{\text{number of cocoon harvested}}{\text{number of larvae reared}} \times 100$$

The data of larval period, weight of matured 5th instar larvae, weight of silk gland, single cocoon weight, shell weight, shell ratio percentage and pupal period were statistically analysed. The measure of dispersion was calculated by using the formula given by Panse and Sukhatme (1985).

Results and Discussion

The rearing performance of eri silkworm on tapioca during autumn season were presented in Table 1. It was observed from the table that the hatching percentage, larval

period of 1st, 2nd, 3rd, 4th and 5th instar larvae, weight of fully matured 5th instar larvae, weight of the silk gland, were found 80%, 3.5±0.71, 2.5±0.71, 4.5±0.73, 6.5±0.71 and 8±1.41 days, 6.46±0.35g and 0.57±0.03g respectfully.

Different cocoon characteristics were presented in Table 2. From the data presented in the table, it was revealed that cocoons were creamy white in colour and were elongated to spindle in shape. Single cocoon weight, shell weight shell ratio percentage, number of cocoons harvested, ERR%, period of pupation and number of DELs produced were found 2.63±0.64, 0.31±0.15, 11.87±0.35, 4050 nos., 90%, 17±1.10 days and 370 nos. respectfully.

The results were found *at par* with the results of the investigations carried out by different investigators. However slightly longer larval period was observed due to lower temperature towards the end the season. The shape, size and colour of eri cocoons vary according to the host plants used. Chutia et. al (2014) studied host plant relation in terms of cocoon colour of eri silkworm and found that cocoons produced from the tapioca leaves fed larvae were rated to be creamy white in colour by 50 per cent followed by white in colour by 40 per cent of the respondents. Colour of the cocoon depends on pigment absorbed from the host plant leaves. Chowdhury (1984) reported that the variation in colour is due to the impermeability of cell wall and silk gland as a result of which the pigment come out along with excrement. Hazarika et. al.(2005) reported that different parameters viz. larval weight, cocoon weight, shell weight, ERR% etc. were found higher in castor. Kumar and Elangovan(2010) also studied the effect of different host plants on larval and cocoon parameters of eri silkworm and found higher larval weight, cocoon weight, shell weight, shell ratio, ERR and pupation rate in Castor fed eri larvae followed by Tapioca fed eri silkworm. Raychaudhury (1974) also studied the effect of different

food plants on the silk percentage and ERR of *P. ricini* Hutt. Kavane (2014) also conducted an experiment on rearing of eri silkworm on papaya (*Carica papaya*) under Western Maharashtra condition. However the present study shows relatively better rearing performance and reveals that Tapioca can be used as primary food plant of eri silkworm during autumn season in Assam.

Table 1. Rearing Performance of Eri Silkworm on Tapioca

No. of DFLs	20
Hatching percentage	80
Larval period (days)	
1 st instar	3.5±0.53
2 nd instar	2.4±0.49
3 rd instar	4.5±0.53
4 th instar	6.6±0.52
5 th instar	8.0±0.71
Weight of mature 5 th instar larvae (g)	6.46±0.35
Weight of silk gland (g)	0.57±0.03

Table 2. Cocoon characteristics of Eri Silkworm reared on Tapioca

Cocoon colour	White to creamy white
Cocoon shape	Elongated to spindle shaped
Single cocoon weight (g)	2.63±0.64
Shell weight (g)	0.31±0.14
Shell ratio %	11.87±0.34
Cocoons harvested (No.)	4050
ERR (%)	90
Period of pupation (days)	17.1±1.10
DFLs produced (no.)	370

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