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Exploitation of Castor Genotypes for Enhanced Eri Silk Production and the Prospects for its Promotion among the Farming Community

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ABSTRACT

The present study was conducted at the research farm of Regional Agricultural Research Station (RARS), Palem, Telangana State, India during *rabi* (October–January) seasons of 2012–13 and 2013–14 to exploit the high yielding castor genotypes with respect to scientific ericulture and to know the prospects for its rate of adoption. Amid the eight genotypes of castor, highest 10th day larval weight of 0.645 g, 0.651 g and 0.639 and highest mature larval weight of 6.012 g, 5.982 and 5.948 g was recorded in the eri silkworm reared on PCH-111, PCH-222 and GCH-4 respectively. Enhancement in shell weight (0.981 g) was obtained in the eri silkworm fed on PCH-111 followed by GCH-4 (0.778 g). Significantly highest ERR was recorded in the eri silkworm reared on PCH-111 (92.7%) genotype and PCH-222 (92.23%) with no significant difference among them. The mortality rate of the eri silkworms reared on different castor genotypes ranged between 3.3%–12.08%. Significantly the highest survival rate of 96.15% was recorded in the eri silkworms reared on Haritha genotype followed by PCH-222 (94.06%). The study revealed that nearly 61.25% of the eri rearers exhibited medium level of extent of adoption, followed by 21.25% with low level of extent of adoption, while about 17.50% of the rearers exhibited high adoption respectively with respect to scientific method of ericulture practices. The perusal of the data revealed that out of nine dependent variables, six variables *viz,* age, educational qualification, size of land holding, family annual income, risk bearing of the rearers and knowledge gained through training were positively and significantly related with the extent of adoption.

KEYWORDS: Castor, exploitation, prospects, promotion, vanya, adoption, cocoon, shell

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1. INTRODUCTION

Eri is the most popular and rapidly expanding sericulture in the vanya silk map of India and is now getting National as well as international limelight. Northeast India is rich in Seri biodiversity being a natural abode for several sericigenous insects and their host plants (Anonymous, 2022). Ericulture once confined to the hilly, tribal districts of Northeastern region of India has spread to several other states *viz.* Andhra Pradesh, Telangana, Madhya Pradesh, Tamil Nadu, Karnataka, Maharashtra, Uttaranchal, Uttar Pradesh, Jharkhand, Bihar, West Bengal, Orissa, Punjab, Uttarakhand, Chhattisgarh, Maharashtra, Gujarat, Rajasthan etc. (Sahu et al., 2006). The reason being, eri silkworm, *Samia cynthia ricini* Boisduval is a multivoltine and polyphagous species and it can be reared throughout the year depending on the availability of feed (Singh and Saratchandra, 2012, Swathiga et al., 2022).

Ericulture primarily comprises two activities *viz.*, food plant cultivation and silkworm rearing. Silkworm nutrition is the major factor which affects the growth, development, and overall production. Almost all insects including the eri silkworm are host specific and select their most preferred food to extract the maximum benefit out of it. It is obvious that the larva attains its maturity and finally into adulthood by consuming its fullest feeding requirements and utilizes it at a particular rate to achieve its proper growth. Thus, the energy stored in the body helps the insect later in performing various metabolic activities which must be completed in the non-feeding period. Moreover, the quality of food which, the insect feeds directly influence on the ultimate quantity of product produced by them. The highly nutritious and nutrient balanced food are the prime factors responsible for healthy growth and development of any insect, as it provides the ultimate source of energy to the insect. Thus, both these aspects of nutrition (quantitative and qualitative) unanimously contribute a much more prominent knowledge and understanding of the insect plant relationship that exists between them because undernourished silkworms are prone to diseases and crop losses (Lakshmanan and Geethadevi, 2005).

Studies on different aspects of eri silkworm and their host plants began way back in 1974. Fukuda (1963) stated that eri silkworm eat fresh leaves of about fifty kinds of plants. Arora and Gupta (1979) reported that eri silkworm is known to feed on more than 30 host plant species but only on a few host plants developmental biology and other related aspects have been studied. Patil and Savanurmath (1994) reported that there are several host plants for eri silkworm, but they have been left unexploited due to lack of technology.

Among the different host plants, Castor (*Ricinus communis* Linn) is the primary, potential and highly preferred host plant of eri silkworm and it also plays an important role in the oilseed production of the country (Subramanianan et al., 2013, Sarmah et al., 2015, Ahmed et al., 2015, Deori et al., 2016, Severino et al., 2010, Sarkar et al., 2015, Lakshmi Narayanamma and Dharma Reddy, 2016, Rajasri and Lakshmi Narayanamma, 2015). Castor is rich in varietal composition and abundantly available to the growers during all the seasons to rear the eri silkworms. It has been observed that growth, development, and cocoon yield of eri silkworm are influenced by the castor genotype and quality of leaves fed to the larvae (Chandrashekhar and Govindan, 2010). Hence the present study was planned to exploit the different castor genotypes for enhanced eri silk production and the prospects for rate of adoption of scientific ericulture technologies among the farming community.

2. MATERIALS AND METHODS

2.1. Study site and year of experimentation

The study was conducted at the research farm of Regional Agricultural Research Station (RARS), Palem, Telangana State, India during *rabi* (October–January) seasons of 2012–13 and 2013–14 with an aim to exploit the high yielding castor genotypes with respect to ericulture. The study site was located at 16°35' N latitude and 78°1' E longitude and an altitude of 642 above mean sea level (MSL) in Southern Telangana Zone (STZ). The experiment was carried out in completely randomized block design with eight genotypes of castor *viz.* Haritha, Kranthi, Kiran, DPC-9, PCH-111, PCH-222, GCH-4 and DCH-177. The crop was sown by adopting a planting distance of 90×60 cm^2. Standard agronomic practices were adopted to raise the crop.

2.2. Eri silkworm rearing

The study was conducted in well-equipped ericulture laboratory of RARS, palem, Telangana. The disease free layings (eggs) of eri silkworm were procured from Regional Eri Research Station (Central Silk Board), Shadnagar. Prior to brushing rearing room and appliances were disinfected with 2% formalin and 5% bleaching powder solution. The eggs were incubated at room temperature and undergone black boxing for uniform hatching by following the standard rearing methods. Three replicates of 400 larvae (one dfl) were maintained separately since second moult. Tender leaves were fed two times a day until third instar and semi tender and mature leaves were fed four times a day during fourth and fifth instar stages. Optimum numbers of larvae were maintained in each tray to avoid overcrowding. To avoid contamination, injured and sick larvae were gathered and buried. Mature worms were mounted in the bamboo chandrikas with optimum spacing i.e. 50–60 worms sq $feet^{-1}$ and maintained with proper aeration in the mounting room.

The cocoons were harvested on the sixth day of spinning. The mature larval mass, cocoon and shell weight were measured by electronic balance with 0.01 g accuracy. The temperature and relative humidity during the season were recorded using the dry and wet bulb thermometer.

The different growth attributes recorded were larval weight (g), larval duration (d), single cocoon weight (g), shell weight (g), shell ratio (%), effective rate of rearing (ERR %), mortality (%) were calculated. Cocoon yield/400 larvae (kg) was also estimated.

2.2.1. Larval weight (g)

Fifth instar mature larvae were selected randomly before ripening and calculated the larval weight in the following expression.

Single larval weight (g)=10 nos. of matured larval weight before ripening/10

2.2.2. Larval duration (days)

Day of hatching to the day of ripening

2.2.3. Single cocoon weight (g)

Randomly selected male and female cocoons (1:1) after harvest were weighed and calculated as follows.

Single cocoon weight (g)=10 nos. of live cocoon with pupa/10

2.2.4. Shell weight (g)

After crop harvest, randomly selected male and female cocoons (1:1 ratio) were cut open, pupae were removed, and shell weight was calculated using the formula.

Single shell weight (g)=10 nos. of cocoon shell/10

2.2.5. Shell ratio (%)

The grade of the silk which can be drawn from numerous living cocoons is indicated by the shell ratio. Male and female live pupae were included in the cocoon weight, which was recorded separately from the cocoon shell weight of the same lot, which was estimated in percentage using the following expression (Krishnaswami et al., 1972)

Shell ratio (%)=Cocoon shell weight without pupa/ Cocoon weight with live pupa×100

2.2.6. Effective rate of rearing (ERR %)

The effective rate of rearing was determined from the total number of larvae brushed and cocoons collected as below.

Effective rate of rearing (ERR %)=Number of cocoons harvested/Number of larvae brushed×100

2.2.7. Mortality (%)

Mortality (%) was calculated as per Singh and Benchamin (2002)

Mortality (%)=No. of dead larvae/No. of larvae brushed×100

2.2.8. Yield/400 larvae (by no. and by weight in kgs)

The yield was calculated by counting the number of cocoons and by the weight basis.

2.3. Adoption rate of scientific ericulture

To popularise the ericulture among the farming community, awareness was created through training progarmmes in co-ordination with Dept. of Sericulture. To know the rate of adoption of scientific ericulture, five villages from three mandals *viz.* Bijinapally, gopalpeta and kalwakurthy were selected by simple random sampling technique. Twenty numbers of respondents were selected from each village and ultimately hundred numbers of respondents were obtained. Extent of adoption of scientific ericulture practices by the rearers was the dependent variable. Age, education, category, family size, land holding, annual family income, source of extension contacts, risk bearing ability, decision making ability and training exposure were the independent variables. Suitable scales were used to measure the variables and a structured interview schedule was prepared. The data was collected personally through interview method. Data thus collected was analysed by using appropriate statistical techniques like simple frequencies, percentage, mean, and standard deviation were calculated along with Karl Pearsons correlation coefficient 't' test.

3. RESULTS AND DISCUSSION

3.1. Growth attributes of eri silkworm

3.1.1. Larval weight (g) (10th day and mature larva)

Larval weight is an important factor deciding the pupal and cocoon characters. Significant variation was observed among the castor genotypes on 10th day and mature larval weight. Amid the genotypes of the castor, highest 10th day larval weight of 0.645 g, 0.651 g and 0.639 and highest mature larval weight of 6.012 g, 5.982 and 5.948 g was recorded in the eri silkworm reared on PCH-111, PCH-222 and GCH-4 respectively. Haritha is the next best genotype with 0.621g and 5.482 g of 10th day and mature larval weight respectively. Kiran recorded the lowest larval weight of 0.514 g, while lowest mature larval weight of 5.160 g was recorded in DPC-9 genotype (Table 1).

3.1.2. Larval duration (days)

Ericulture practicing farmers view the larval duration as a crucial trait since it reduces the overall amount of food used without impacting the yield of cocoons. The genotype PCH-111 performed well by recording the lowest larval duration of 19.33 days followed by PCH-222 (19.54 days) and GCH-4 (19.6 days). The eri silkworm reared on the leaves of DPC-9 recorded the highest larval duration of 21.2 days. The present results are in accordance with the results of Lakshmi Narayanamma and Padmasri, 2021,

Table 1: Larval, pupal, cocoon and shell parameters of the eri silkworm reared on the selected castor genotypes

Genotype	Larval weight 10th day (g)	Mature larval weight (g)	Larval duration (days)	Pupal duration (days)	Rate of pupation (%)	Pupal weight (g)	Cocoon weight (g)	Shell weight (g)	Shell ratio (%)
Haritha	0.621[ab]	5.482[b]	20.21[c]	18.12	97.67[b] (81.26)	1.609[c]	2.012[e]	0.403[fg]	20.03[g]
Kranthi	0.525[d]	5.252[c]	20.69[e]	18.06	95[d] (77.12)	1.526[a]	1.984[f]	0.458[e]	23.08[e]
Kiran	0.514[d]	5.380[bc]	20.90[f]	18.09	95[d] (77.12)	1.604[c]	1.990[f]	0.386[h]	19.40[h]
DPC-9	0.560[c]	5.160[d]	21.2[g]	17.98	96[c] (78.52)	1.701[e]	2.014[e]	0.313[i]	15.54[i]
PCH-111	0.645[a]	6.012[a]	19.33[a]	18.21	98.68[a] (83.46)	1.631[c]	2.612[a]	0.981[a]	37.56[a]
PCH-222	0.651[a]	5.982[a]	19.54[b]	18.01	97.14[b] (81.02)	1.686[de]	2.415[c]	0.729[c]	30.19[c]
GCH-4	0.639[a]	5.948[a]	19.6[b]	17.94	96.98[b] (79.94)	1.706[e]	2.484[b]	0.778[b]	31.32[b]
DCH-177	0.529[cd]	5.451[b]	20.45[d]	18.08	94[e] (75.24)	1.667[d]	2.212[d]	0.545[d]	24.64[d]
SEd	0.024	0.038	0.063	0.083	1.984	0.016	0.009	0.014	0.048
CD (p=0.05%)	0.048	0.142	0.158	-	0.692	0.032	0.012	0.016	0.168

Means followed by similar letter(s) are not significantly different by DMRT (p=0.05); Figures in the parenthesis are angular transformed values

who reported that the eri silkworm larvae reared on the genotype PCH-111 recorded the highest larval weight and the lowest larval duration. While Dutta et al., 2015 stated that castor is nutritionally superior for better larval growth of the eri silkworm.

3.1.3. Pupal duration (days), pupal weight (g) and rate of pupation (%)

The eight castor genotypes used for the rearing of eri silkworm did not differ significantly with respect to pupal duration. The eri silkworm larvae reared on all most all the genotypes recorded pupal duration of 18 days. The eri silkworm larvae reared on the genotype kranthi recorded the lowest pupal weight of 1.526 g. The castor genotype PCH-111 exerted the highest rate of pupation of 98.68% followed by PCH-222 (97.14%), GCH-4 (96.98%) and Haritha (97.67%) with no significant difference among them. The variation that was observed among the genotypes might be attributable to the fact that these genotypes vary in the composition of foliar nutrients which in turn contribute to the differences in the larval and pupal weight (Supriya, 2020).

3.1.4. Cocoon weight

One of the key commercial characteristics considered in price fixation is cocoon weight. In the present study, the eri silkworm larva reared on the castor genotype PCH-111 recorded the highest cocoon weight of 2.612 g. GCH-4 castor genotype recorded the second highest cocoon weight of 2.484 g followed by PCH-222 (2.415 g). The present results are in concurrence with Deori et al. (2016), who stated that castor genotypes GCH-4 and GCH-2 are the better performers having higher ERR (%) and cocoon weight. The variation in cocoon weight might be due to the impact of environment and the genetic potential of the eri silkworm race. Variation in qualitative and quantitative characters of the cocoon not only depend on the environment but also on the type of the food plants used for feeding (Chandrasekhar and Basavaraja, 2008).

3.1.5. Shell weight (g)

Significant difference was observed among the castor genotypes with reference to shell weight. Enhancement in shell weight (0.981g) was obtained in the eri silkworm fed on PCH-111 followed by GCH-4 (0.778 g). The genotype DPC-9 yielded significantly lowest shell weight of 0.313 g. The outcome is consistent with the research findings of Chakarvorthy and Neog, 2006, who reported the shell weight of 0.86 g for GCH-4. The present study agrees the results of Swathiga et al., 2022 and Siddique et al., 2000, who stated that the population of *S. C. ricini* showed variation in quantitative characters such as cocoon weight, shell weight and shell ratio in respect to genotypes.

3.1.6. Shell ratio

The weight of the shell determines how much silk may be extracted from each cocoon. Consequently, it is crucial to determine the shell ratio. Among the genotypes PCH-111 proved its superiority by recording higher shell ratio of 37.56% followed by GCH-4 with 31.32%. Eri silkworm larvae reared on DPC-9 leaves recorded the lowest shell ratio of 15.54% (Table 1). The present results agree with Hazarika et al., 2000, who noted a comparable shell ratio of 16.48, 16.37, 16.34 and 16.22% on khanapara, lahing, titabar and nongpoh ecoraces respectively followed by Mendipathar (16.02%) and Diphu (15.65%). This outcome is consistent with Swathiga et al. (2022), who noted a comparable shell weight (18.4%) in Mendipathar. Adokgri and Barpathar recorded the lowest shell ratio of 14.23 and 13.46% respectively.

3.2. Economic parameters of eri silkworm

3.2.1. Effective rate of rearing (ERR%)

Significant variation in ERR was observed among the different castor genotypes. ERR is the best indicator of survivability of silkworm during the crop. ERR is an imperative physiological criterion for selecting the superior castor genotypes (Trivedy and Nair, 1998). ERR has direct impact on the ultimate cocoon yield. Significantly highest ERR was recorded in the eri silkworm reared on PCH-111 (92.7%) genotype and PCH-222 (92.23%) with no significant difference among them. While eri worms fed with DCH-177 recorded lowest ERR (%) of 88.5% (Table 2). Lalitha et al. (2023) indicated that dynamic environmental conditions had variations on growth and development as well as the expression of ERR, when reared on different castor genotypes. Similarly, Teronpi et al. (2020) reported that autumn season showed better performance than spring season in respect of weight of full-grown mature larvae and ERR. Summer season recoded less productivity due to low rate of feeding, while winter revealed low productivity performance due to low food conversion efficiency.

3.2.2. Survival rate (%)

Significantly highest survival rate of 96.15% was recorded in the eri silkworms reared on Haritha genotype followed by PCH-222 (94.06%) with no significant difference between them. The results are in accordance with Swathiga et al. (2022) who worked on the growth attributes of eco races of eri silkworm reported that highest survival rate of 94.55 and 93.36% was recorded in the F_1 hybrid and Jonai ecoraces.

3.2.3. Mortality

Table 2: Economic parameters of the eri silkworm reared on the selected castor genotypes

Genotype	ERR (%)	Survival rate (%)	Mortality (%) due to factors		Cocoon yield (kgs)
			Abiotic	Biotic	
Haritha	90.83^{c} (72.37)	96.15^{a}	3.30^{a}	2.14^{a}	13.2
Kranthi	88.35^{e} (70.05)	84.63^{c}	6.56^{d}	3.62^{b}	12.4
Kiran	89.94^{d} (71.51)	85.46^{c}	8.80^{e}	5.74^{c}	12.0
DPC-9	90.54^{cd} (72.09)	89.81^{b}	9.77^{f}	5.60^{c}	11.8
PCH-111	92.70^{a} (74.32)	90.97^{b}	5.81^{c}	3.21^{b}	15.1
PCH-222	92.23^{ab} (73.81)	94.06^{a}	3.79^{a}	2.84^{a}	14.6
GCH-4	91.46^{bc} (73.01)	91.64^{b}	4.94^{b}	3.42^{b}	14.8
DCH-177	88.5^{e} (70.18)	81.12^{c}	12.08^{f}	6.79^{d}	11.9
SEd	0.056	0.62	0.03	0.04	0.072
CD (p=0.05%)	1.081	1.28	0.07	0.08	0.18

Means followed by similar letter(s) are not significantly different by DMRT (p=0.05); Figures in the parenthesis are angular transformed values

3.2.3.1. Mortality due to abiotic conditions

Minimum mortality indicates more sustainability to environment and disinfection. The mortality rate of the eri silkworms reared on different castor genotypes ranged between 3.3%–12.08%. In the present study, the results among the different genotypes tested, eri silkworms reared on Haritha genotype recorded lowest mortality of 3.3%, which was on par with PCH-222 (3.79%) (Table 2). The highest mortality was recorded on DCH-177 (12.08%) and DPC-9 (9.77%) with no significant difference between them. The present results are consistent with Lakshmi Narayanamma and Dharma Reddy, 2016, who reported that the eri silkworm optimal temperature range for growth was between 20–35°C and the temperature above 35°C resulted in larval mortality.

3.2.3.2. Mortality due to biotic factors

Haritha genotype proved its superiority by recording lowest mortality rate of 2.14% followed by PCH-222 (2.84%) with no significant difference between them. While eri worms reared on DCH-177 recorded highest mortality of

6.79%. The change in environmental conditions alters the physiology of worms and hence they become susceptible to either environment or diseases. In the present study, highest mortality rate of 6.79% was caused due to bacteria. According to Das and Saikia (2023), eri silkworms are typically more resilient and resistant to pests and diseases than mulberry silkworms. The present result strengthened the findings of Ray et al., 2010, who stated that commercial breed recorded lower mortality compared to eco races.

3.2.4. Cocoon yield

Significant differences were observed with respect to cocoon yield among the castor genotypes investigated (Table 2). Highest cocoon yield of 15.1 kg was recorded with the eri silkworm larvae reared on PCH-111 followed by GCH-4 with 14.8 kg ha^{-1} and PCH-222 (14.6 kg ha^{-1}). These results are inconformity with Lakshmi Narayanamma et al. (2013), who reported that the cocoons spun by the worms fed on PCH-111 and GCH-4 genotypes recorded significantly superior shell weight. Significantly lowest shell yield was recorded by the eri silkworms reared with the leaves of DPC-9 (11.8 kg ha^{-1}). The works of Jaiswal and Kumar (2005) stated that economic metrics like yield, cocoon weight and shell weight are known to be influenced by many environmental conditions including temperature, relative humidity, and photoperiod etc, strengthening the present findings.

3.3. Extent of adoption of scientific ericulture practices

An attempt was made to analyse the level of adoption of individual components of scientific ericulture practices by the rearers. Some of the individual practices were adopted in full or not adopted at all, while among some practices, partial adoption was recorded (Table 3).

3.3.1. Use of high yielding host plant varieties

Among the respondents 67.5% of the rearers expressed their willingness to fully adopt the technology, while 27.5% of the rearers partially adopted. 5% of the rearers did not adopt at all.

3.3.2. Use of pest and disease tolerant varieties

73.75% of the rearers expressed their willingness to adopt this practice. Only 2.5% rejected to adopt. This is mainly because of the awareness they got about the importance of the variety/genotype, playing a crucial role in the establishment of ericulture.

3.3.3. Recommended dose of nutrient management

In case of nutrient management 52.5% of the rearers, partially adopted this practice and 11.25% not adopted. The reason may be due to lack of proper guidance and by observing the fellow farmers, they are not willing to take

Table 3: Extent of adoption of package of practices for rearing of eri silkworm

Sl. No.	Package and practices of raising host plants	Full adoption		Partial adoption		No adoption	
		Frequency	%	Frequency	%	Frequency	%
1.	Use of high yielding host plant varieties	54.00	67.50	22.00	27.50	4.00	5.00
2.	Use of pest and disease tolerant varieties	59.00	73.75	19.00	23.75	2.00	2.5
3.	Recommended dose of nutrient management	0.00	0.00	42.00	52.50	9.00	11.25
4.	Timely intercultural operations	40.00	50.00	39.00	48.75	1.00	1.25
5.	Use of neem formulations in the initial stage of the plant growth	0.00	0.00	0.00	0.00	80.00	100.00
6.	Collection and destruction of affected plants and shoots	25.00	31.25	59.00	73.75	2.00	2.50
7.	Timely weed management to prevent the pest and disease inoculum	30.00	37.50	42.00	52.50	10.00	12.50
8.	Disinfection of grainage house	9.00	11.25	51.00	63.75	20.00	25.00
9.	Use of high yielding eco race of eri silkworm for rearing	25.00	31.25	45.00	56.25	10.00	12.50
10.	Use of separate rearing house	18.00	22.50	20.00	25.00	42.00	52.50
11.	Disinfection of rearing room and rearing equipment	30.00	37.50	50.00	62.50	0.00	0.00
12.	Use of bed disinfectant	2.00	2.50	18.00	22.50	60.0.	75.00
13.	Maintenance of appropriate environmental conditions in the rearing room	9.00	11.25	45.00	56.25	54.00	67.50

up recommended dose of fertilizers.

3.3.4. Timely intercultural operations

Among the rearers, majority (50%) of the farmers fully adopted timely intercultural operations, while 48.75% partially adopted followed by 1.25% rearers did not adopted the practice.

3.3.5. Use of neem formulations in the initial stage of the plant growth

In case of this practice, 100% of the rearers did not adopt. The knowledge on use of neem formulation depends on education, social participation and extension contact etc.

3.3.6. Collection and destruction of affected plants and shoots

About 73.75% respondents partially adopted this technology, while 31.25% fully adopted. This is mainly depending on socio economic status and mass media exposure etc.

3.3.7. Timely weed management to prevent the pest and disease inoculum

This is the most useful practice, which mainly helps in removal of alternate hosts, which in turn supress the pest and disease infestation. 52.5% of the respondents partially adopted and 37.5% of the respondents expressed their willingness to adopt the practice.

3.3.8. Disinfection of grainage house

Among the rearers 63.75% partially adopted disinfection of grainage house followed by 25.00% did not adopt and 11.25% of the respondents adopted the practice fully. The partial adoption of this technology among the rearers is due to the frequent demonstrations carried out by the extension officers and the less interest of the rearers.

3.3.9. Use of high yielding eco race of eri silkworm for rearing

56.25% of the rearers partially adopt use of high yielding eco race of eri silkworm for rearing technology. 31.25% of the respondents adopted fully, whereas 12.50% of them not adopted the technology. It is because of unawareness and the lack of adequate knowledge on availability of high yielding eco races among the rearers.

3.3.10. Use of separate rearing house

Majority (52.50%) of the respondents did not adopt the practice. 25.00% of the rearers partially adopted and only 22.50% of the total respondents adopt the practice fully. It is due to unawareness of new practices as well as the lack of finance and credit facilities.

3.3.11. Disinfection of rearing room and rearing equipment

The grainage rooms along with its appliances should be thoroughly disinfected prior to commencement of operation and kept ready to receive seed cocoons. Majority of the rearers *i.e* 62.50% partially adopted followed by 37.50% fully adopted this practice.

3.3.12. Use of bed disinfectant

76.00% of the respondents not at all adopted this technology, 5.00% of them partially adopted. Disinfection is an integral part of healthy and successful silkworm rearing. It aims at the destruction of disease-causing pathogens. Due to lack of information and knowledge on new technology, rearers not using this practice.

3.3.13. Maintenance of appropriate environmental conditions in the rearing room

67.5% of the rearers not at all willing to maintain the appropriate environmental conditions in the rearing room, while 67.5% not adopted this practice. This is mainly because of lack of awareness about the importance of the practice (Table 3). The results agree with Sonowal et al. (2019) who revealed that nearly 61.25% of the eri rearers exhibited medium level of extent of adoption, followed by 21.25% exhibited low level of adoption, while about 17.50% of the rearers exhibited high level of adoption respectively with respect to scientific method of eri silkworm rearing practices.

3.4. Correlation of extent of adoption of eri rearers with their socio-economic and psychological characteristics

The correlation provides information about the relationship and its nature between independent and dependent variables. The calculated correlation coefficient values between extent of adoption of eri rearers and their socio-economic and psychological characteristics are presented in Table 4. The perusal of data revealed that out of nine dependent variables, six variables *viz.* age, educational qualification, size of land holding, family annual income, risk bearing of the rearers, and knowledge gained through training were positively and significantly ($p \leq 0.05$) related with the extent of adoption, whereas decision-making ability was negatively and significantly related with the extension of adoption. Size of the family and extension exposure have negative and non-significant relation with extent of adoption (Table 4).

In the present study, it was observed that category, family size, extension exposure and decision-making ability did not associate with the extent of adoption of ericulture practices. Battula et al. (2015) reported that family size had no significant influence on the adoption level of technologies in sericulture. Meenal and Rajan (2007) revealed that knowledge and adoption was significantly influenced by most of the socio-economic characters of sericulturists except age, education, and family size. Rabha and Saikia (2021) stated that training is a prominent tool in the adoption of ericulture activities particularly among women farmers.

Table 4 : Correlation between extent of adoption of eri rearers with their socio- economic and psychological characteristics. N=100

Sl. No.	Variables	'r' value	't' value
1.	Age	0.208175	2.71*
2.	Educational qualification	0.00954	2.42*
3.	Size of the family	-0.03744	1.86
4.	Size of land holding	0.14947	2.98*
5.	Family annual income	0.00653	3.32*
6.	Extension exposure	-0.22479	1.13
7.	Risk bearing ability	0.03738	2.48*
8.	Decision making ability	-0.17005	7.18*
9.	Knowledge gained through training	0.07453	2.57*

*Significant at (p=0.05) level of probability

4. CONCLUSION

Though highest survival rate of eri silkworm was recorded in the Haritha genotype, the economic parameters like ERR, shell weight and cocoon weight were highest with PCH-111, PCH-222 and GCH-4 genotypes. Out of the eri rearers, 61.25% and 17.50% exhibited medium and high level of extent of adoption respectively with respect to scientific method of ericulture practices. Age, education, family size and income, risk bearing ability and training exposure were positively and significantly related with the extent of adoption of ericulture.

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