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ANALYSING MOST SUITABLE ECO RACE FOR IMPROVING GROWTH CYCLE OF THE ERI SILKWORM

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ABSTRACT

One of the most economic exploitation, widely cultivated, and financially viable non-mulberry silkworms is the eri silkworm (Philosamia ricini). The feeds that eri silkworms consume have a significant impact on their yield and silk production. A study was conducted to assess the growth characteristics of the eco races of the eri silkworm in the circumstances of western region of Tamil Nadu. The Central Muga and Eri Research Institute in Jorhat, Assam provided the eco races of eri silkworm. Three replications of the Completely Randomized Design (CRD) were used to set up the treatments. By feeding worms with castor leaves in the cellular rearing method, the growth characteristics of eco races of eri silkworm, specifically the larval parameter and cocoon parameter, were examined.

Keywords: - Silkworm, Non-mulberry, Races, Eco, ERI

INTRODUCTION

Growing host plants, raising silkworms, spinning thread, and weaving silk into textiles are all part of North Eastern India's thriving ericulture business. With its cotton-like silky yarn and exceptional thermal properties, the Eri culture stands out among other types of sericulture including the Mulberry, Tasar, and Muga. Because of its warmth, eri cloth is often substituted for wool. After mulberry and Chinese Tasar, the silk spun by the eri silkworm is regarded as the world's third most important kind of silk. Nearly all of India's eri raw silk comes from the region of Northeastern India.

The larvae of the eri silkworm feed on the leaves of host plants, the most common of which being castor (Ricinuscommunis L.). Because different secondary host plants can have varying effects on the relative survival of a herbivore insect, castor has a particularly rich biochemical composition, foliar constituents, and rearing parameters. Castor genotype and quality of leaves on which worms are grown are known to affect worm growth, development, and cocoon production (Pandey, 1995). The nutritional value of leaves is thought to have a significant role in the success of silkworms that feed on plants other than mulberries.

Temperatures above the optimal range of 20° C to 35° C for the development of Eri silkworms lead to reduced spinning, larval and pupal mortality, poor moth emergence, and adult sterility. There are 19 known species of eri silk moths in tropical Asia, and three of them are endemic to India: Samiaricini, Samiacanningie, and Samiafulva. The most widely cultivated of the 19 species of eri silkworms contains 18 morphologically and genetically distinct varieties or eco races: S. ricini.

SILK WORM OF ERI

Philosamia ricini, or the erisilkworm, is a non-mulberry polyphagous species that traditionally feeds on castor leaves and is raised in the northeastern area of India for human use.

Eri silk is long-lasting, smooth, and easy to combine with different silks. When combined with other polyester fibers, the mix improves both shine and cost-effectiveness. The eri silkworm (P. ricini) relies on a wide variety of host plants, many of which may be found in the northern Indian states of Uttar Pradesh and Uttaranchal. Growing castor (Ricinuscommunis) as a protective shade or intercrop with other crops for its oil seed is common practice. Different host plants and seasons were found to affect the time it took for eri silkworm larvae to pupate, as documented by Hazarika et al., 2003. The spring season in Uttar Pradesh has the best weather conditions, hence a disease-resistant strain is needed for this time of year. This research was conducted to identify an appropriate eco-race of eri silkworm for the spring seasons in Uttar Pradesh, bearing the aforementioned considerations in mind.

Different stages of eri silkworm, S. ricini

The current study found that there were a total of five instars of larval development in the eri silkworm. The neonatal larvae, fresh from hatching, were a drab yellow with black markings and hairs. The hairs on the brown head capsule were black. Between the two rows of bigger black dots, there was a cluster of smaller black spots. The larva's thoracic prolegs were black. After two days, its hue shifted to a pale yellow with two black patches on its prothorax. However, the remaining abdominal and thoracic segments each had a single dark brown spot, separated by a row of smaller brown spots.

MATERIALS AND METHODS

The aim of the current experiment is to find the ecoraces that are most suited to the environmental circumstances in western zone of Tamil Nadu. During the academic year 2020–2021, the study was carried out at Department of Sericulture, Forest College and Research Institute.

Collection of Eco Races of Eri Silkworm

From the Central Muga and Eri Research Institute in Jorhat, Assam, eggs of eco races of the eri silkworm were obtained. The eco races are Adokgri, Jonai, Titabar, Diphu, Mendipathar, Nongpoh, Borduar, Khanapara, Barpathar, and Lahing. These eco-races were contrasted with F1 commercial hybrids that were kept as the norm.

Rearing of Eco Races

The standard raising method was used using eggs from the Central Muga and Eri Research Institute in Jorhat, Assam, which included the eco races of eri silkworms Adokgri, Jonai, Titabar, Diphu, Mendipathar, Nongpoh, Borduar, Khanapara, Barpathar, and Lahing, as well as commercial F1 hybrid eggs. The rearing process occurred in the 2020s. Three replicates of 400 larvae from each eco race were maintained apart after the second moult. Castor leaves were fed four times a day during the instars IV and V stages. Injured and ill larvae were collected and buried to prevent contamination. The optimal number of larvae was maintained in each dish to avoid overpopulation. Weight of larvae (g), length of larval stage (d), weight of a single cocoon (g), and weight of the adult butterfly shell (g) were all reported. The percentages of shell ratio, ERR, and mortality were determined. The expected yield per 400 larvae was also calculated (in kilograms).

RESULT AND DISCUSSION

Larval Weight (g)

Larval weight is an important factor deciding the pupal and cocoon characters. Significant variation was observed among the eco races of eri silkworm. In the midst of the eco races of eri silkworm, F1 hybrid and Jonai performed well recording the highest larval weight of 7.13 g and 7.09 g respectively. Khanapara, Lahing and Titabar were the next best recording the larval weight of 6.90 g, 6.76 g and 6.74 g respectively followed by Nongpoh (6.69 g), Mendipathar (6.66 g) and Diphu (6.64 g). Barpathar (6.33 g) and Adokgri (6.42 g) recorded the lowest larval weight.

The current findings are consistent with those of,13 who indicated that larval weights in Titabar and Borduar, respectively, were 6.75 g and 6.52 g (Table 1).

Larval Duration

Longer larvae need less food, which benefits farmers who raise silkworms for their silk, but doesn't affect cocoon production. Eco-race Jonai did well, recording the shortest larval duration at 542.5 hours, which was the same as F1 hybrid (541 hours). This was followed by Khanapara, Lahing, and Titabar, which recorded 548 hours, 564 hours, and 570 hours, respectively. Adokgri and Barpathar both had the longest larval durations (589 hours), and these two values were comparable to one another. This finding is supported by the findings of14, who found a correlation between Borduar and Titabar in terms of larval length (Table 1).

Cocoon Weight

One of the key commercial characteristics taken into account in price fixation is cocoon weight. In the present study, Jonai recorded the highest cocoon weight of 3.93 g and was on par with standard (3.96 g) and lowest cocoon weight was recorded in Barpathar (3.23 g) (Table 1). Interestingly, F1 hybrid recorded the highest cocoon weight of 3.96 g.

Shell Weight

Enhanced shell weight (0.66 g) was obtained in Jonai which was on par with standard (0.67 g) followed by Khanapara (0.63 g), Lahing (0.61 g) and Titabar (0.60 g) and all were on par with each other. Barpathar (0.43 g) and Adokgri (0.47 g) recorded significantly lowest shell weight and was next to Nongpoh (0.58 g), Mendipathar (0.56 g) and Diphu (0.54 g) which were on par with each other.

Shell Ratio

How much silk can be harvested from a cocoon is proportional to the heaviness of the shell. As a result, knowing the shell ratio is essential. F1 hybrid had a substantially higher shell ratio than the other eco races, coming in at 16.91 percent (Table 1). Similarly, 19 reported a shell ratio of more than 16% in several eco races.

Eco races	Larval weight (g)	Larval duration (h.)	Cocoon weight (g)	Shell weight (g)	Shell ratio (%)
Adokgri	6.42d	589d	3.30d	0.47d	14.23d
Jonai	7.09a	542.5a	3.93a	0.66a	16.78ab
Titabar	6.74b	564b	3.67c	0.60b	16.34b
Diphu	6.64c	570c	3.44cd	0.54c	15.65c
Mendipathar	6.66c	570c	3.52cd	0.56c	16.02bc
Nongpoh	6.69c	569.5bc	3.60c	0.58c	16.22b
Borduar	6.53d	576d	3.37d	0.50c	14.96cd
Khanapara	6.90b	548ab	3.82b	0.63ab	16.48b
Barpathar	6.33d	589d	3.23d	0.43d	13.46d
Lahing	6.76b	564b	3.75b	0.61b	16.37b
F1 hybrid	7.13a	541a	3.96a	0.67a	16.91a
SEd	0.0228	2.4066	0.3056	0.0151	0.0158
CD (0.05%)	0.0474	4.9909	0.6338	0.0313	0.0329

Means followed by similar letter(s) are not significantly different by DMRT (P = 0.05)

After Mendipathar (16.02%) and Diphu (15.65%), Khanapara (16.48), Lahing (16.37), Titabar (16.22), and Nongpoh (16.22) all had similar shell ratios. This result agrees with the results of 20 researchers who found similar shell densities in Mendipathar. Shell ratios of 14.23 and 13.46 percent were found in Adokgri and Barpathar, respectively.

CONCLUSION

The results show that the eco races of the eri silkworm develop differently. As a result of its better growth properties, the eco race Jonai has the most economic potential for increasing eri cocoon production outside of its typical habitats, such as in Tamil Nadu. The eco races Khanapara and Lahing came in a close second and third, respectively.

Borduar, an eco-race, outperformed the others when fed on the GCH 4 genotype, and this advantage may be used economically to increase eri cocoon production in places where they aren't normally grown, like as Tamil Nadu.

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