A STUDY ON ERI SILKWORM

*Samia ricini* Donovan ECORACES

WITH SPECIAL REFERENCE TO SEED PRODUCTION

AN ABSTRACT SUBMITTED TO GAUHATI UNIVERSITY FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY IN DEPARTMENT OF ZOOLOGY IN THE
FACULTY OF SCIENCE

SUBMITTED BY

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ASSAM ( INDIA )
2013
ABSTRACT

The thesis deals with the detailed study of ecoraces of cultivated eri silkworm, *Samia ricini* Donovan and their morphological characters, rearing and grainage performances in different season with special information of eri seed production, embryo isolation and eri seed preservation. The proposed study is undertaken with an aim to identify the superior eri races having both quality and quantity economic characters.

Considering the above facts and findings, the present experimental project was undertaken with the following objectives:

Collection of available ecoraces of eri silkworm from different potential eri growing areas of North Eastern region of India and their maintenance in the eri germ plasm bank at Central Muga Eri Research & Training Institute, Lahdoigarh, Jorhat, Assam.

To conduct rearing and seed production activities for eight to ten consecutive generations of collected germplasm and to find out the superior ecoraces of eri silk worm having higher reproductive potentiality and desired economic characters.

Development of eri seed preservation technology in order to skip off unfavourable climatic condition through the study of embryonic developmental stages and ages of eri silkworm eggs.

The ecoraces of eri silkworm were collected and maintained in the Germ Plasm Bank of CMER & TI, Central Silk Board, Lahdoigarh, Jorhat (Assam) for two consecutive years. The ecoraces of eri silkworm reared successfully throughout the year in different seasons on primary food plant, Castor *Ricini communis*, Linn. Morphological characterization of pre-cocoon stages *i.e.* eggs, larvae, cocoon and
moths were conducted as per descriptor. To investigate the superior ecoraces of eri silkworm having the higher economic character *i.e.* cocoon weight, pupal weight, shell weight, ERR (%), fecundity, a thorough study has been conducted.

Rearing and grainage data of eight consecutive generations reveals that, each economic character have variation of cultivated eri silkworm *Samia ricini* Donovan. The hatching percentage, larval weight and cocoon weight is also varied according to different ecoraces of eri silkworm. Maximum hatching, maximum larval weight and highest cocoon weight were found in Diphu, Borduar and Barpeta ecoraces. Pupal weight, shell weight and ERR % was also found highest in Diphu, Borduar and Barpeta ecoraces in different seasons. Maximum moth emergence, maximum coupling and highest fecundity were found in case of the Diphu, Borduar and Barpeta ecoraces.

Thereafter, eri silkworm ecoraces showed longer duration in larval period during the winter season than spring, summer and autumn season. All the silkworm ecoraces showed less larval growth and pupal weight during the winter season in comparision to other seasons probably due to low temperature and humidity. Similarly, other important economic characters *viz.* cocoon weight, shell weight, cocoon yield were lower during the winter season than in the spring and autumn season. The fecundity and hatching percentage were also found lower in winter and summer than in autumn and spring season. During the summer season, the silkworm ecoraces showed inferior growth and development and all other economic traits than winter, spring and autumn seasons. The study reflected that only the autumn and spring season is more suitable for the commercial eri silk worm rearing among the all seasons.
The analysis of growth and economic traits of different ecoraces of eri silkworm reveal that, Diphu, Borduar and Barpeta ecoraces are the highest eri yielding silkworm races for commercial eri raw silk production.

The experiment of multivoltine eri silkworm eggs preservation was conducted for development of the eri seed preservation technology. For the experiment of eri seed preservation, different stages of eri silkworm embryo were isolated successfully. Eri embryo stages: 15, 17, 21, 22, 23, 24, 25, 27, 28 & 29 were isolated for long term preservation of eri seed and preparation of embryonic chart.

For the experiment of eri seed preservation, five different age groups and stages viz. 12 hrs, 24 hrs, 36 hrs, 48 hrs, and 60 hrs old eggs were preserved in BOD in the temperature of 5 ºC and 75 - 80 % relative humidity as per recommended methods. The study revealed that the 36 - 42 hrs old age group and embryonic stages - 15 showed maximum 30.67 days of preservation without affecting the normal hatching and rearing performance. The respond group of eggs hatched after total 35 days including incubation period in against only 9 days of control lot. Rearing of preserved lot of eri eggs were conducted successfully and rearing performance was found normal, where all the economic characters i.e. cocoon weight, shell weight and ERR % were also found significant.

The experimental result indicates that the multivoltine eri silkworm eggs can be preserved successfully for long duration. Hence, the developed eri seed preservation technology will play an important role for planning the rearing schedule according to season or to overcome the unfavorable season. This is the first effort in eri culture in respect of preservation of eri silkworm egg for long duration.

Due to the unavailability of established technology on the preservation of eggs in eri culture, rearing scheduled cannot be planned as per the availability of food plants, which result in poor cocoon crop harvest. Therefore, the developed eri
seed preservation technology will play a vital role to systematize the eri seed sector for production and supply of the eri dfls in time as per demand.

The experimental findings clearly indicates that the high yeilding eri silkworm ecoraces *i.e.* Diphu, Borduar and Barpeta are the most promising eri silkworm ecoraces both in quality and quantity for commercial rearing and seed production. These selected eri silkworm races are recommended for commercial rearing for the eri grower.

The result of the present study of identification of superior ecoraces of cultivated eri silkworm and development of the eri seed preservation technology will play a significant role for eri cocoon production and to set up systematic eri seed production and supply to increase the eri raw silk production in our country.

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Signature & seal of the Guide

Submitted by

Date:

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