

Effect of Differential Feeding on Eri Silk Worm (*Samia Ricini* Donovan) and its Pupal Protein Concentration

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ABSTRACT:

Eri silk worm is the only domesticated non- mulberry silk worm. It is traditionally reared in Assam by various ethnic groups from time immemorial. Eri silk worm is mainly reared on castor leaves, but being a polyphagous insect it may be reared on other plants also. In our study eri silk worm was reared on one of its feeding plant- Kesseru, keeping castor as control, to study its effect on the life cycle as well as larval and pupal protein contents. From the experiment it was found that there is not much difference between the results of the control and the experimental results. Therefore it can be concluded that eri silk worm can be reared on Kesseru leaves during scarcity of castor leaves.

KEYWORDS: ERI- Silk, Feeding plant, Life cycle.

1. INTRODUCTION:

Sericulture refers to the conscious mass scale rearing of silk producing organisms in order to obtain silk from them. It plays an eminent role in the rural economy of India. It is a viable agro-based industry, which was first introduced into India about 400 years back. India is the world's second largest producer of raw silk (18,500 MT/Year). Among Vanya silk eri silk production is the highest. Eri culture is mostly confined to the Brahmaputra valley of Assam and in few districts of the neighbouring states mainly Meghalaya, Nagaland, Manipur and Arunachal Pradesh. Almost 95% of Eri production in the country comes from Northeast India to which Assam's share is about 50%. The Eri silk production has gone up from 1316 MT in 2002-03 to 3072 Mt in 2011-12 in the country. The production trend of eri silk worm in Assam during the last decade is shown in the following table.

TABLE 1: TREND OF GROWTH IN ERI RAW SILK PRODUCTION (2002-03 TO 2013-14)

Year	Production of raw silk(MT)
2002- 03	1316
2003- 04	1352
2004-05	1448
2005-06	1442
2006-07	1485
2007-08	1530
2008-09	2038
2009-10	2460
2010-11	2760
2011- 12	3072
2013- 14	4236

SOURCE: CSB, ANNUAL REPORTS

In Assam, Eri culture is a traditional agro-based small scale industry primarily practiced to meet the partial need of warm clothing. Around 1.30 lakhs families of Assam are involved in eri culture. Moreover, eri pupae are popular as delicacy among the tribal people of this region. Eri-silkworm *Samia*

ricini (Donovan) is multivoltine and polyphagous in nature feeding on a number of host plants namely Castor, *Ricinus communis* Linn; Kessuru, *Heteropanax fragrans* (Roxb.) Seem; Tapioca, *Manihot esculanta* Crantz; Korha, *Sapium eugeniifolium* Buch-Ham; Payam, *Evodia flaxinifolia* Hook; Borpat, *Ailanthus grandis* Prain; Borkessuru, *Ailanthus excelsa* Roxb; Gulancha, *Plumeria acutifolia* (Poir); Papaya, *Carica papaya*; Bangali era, *Jatropha curacus* Linn and several others (Sarmah, 2004). Amongst various factors for good quality of cocoon production, nutrition plays an important role. Though castor is the main host plant of eri silkworm, castor leaf is not available throughout the year and the crop has to be sown every year. During winter season (long dry spell), its leaf yield gets considerably reduced. Therefore, scientific study is needed to identify other perennial food plants which can meet the demand without compromising with the quality and quantity of cocoon production. Though Kessuru ranks second among all the food plant of eri silkworms, it is observed that except some information on agronomical aspects, detailed studies on kessuru as a perennial host plant of eri silkworm is inadequate. Further, it is observed that in the rearers' field condition, performance of eri silkworm rearing using kessuru foliage is not uniform in all the seasons. Therefore, in this paper, an effort has been made to study some of the aspects of differential feeding which may influence the production of eri silk in practice.

2. OBJECTIVES:

1. To study the duration of life cycle after differential feeding (Control- Castor, Experimental- Kessuru)
2. To study some biochemical aspects of feeding leaves
3. To estimate pupal protein concentration.

3. MATERIALS AND METHOD:

DFL for rearing were collected from CSB, Lahdoigarh, Jorhat, Assam. Rearing was done during March-April, 2014. Leaves of both the host plants were dried in hot air drier oven at 70°C and made powder using grinder and analyzed. For protein estimation Lowery's method was followed after making dry powder from the pupa following the same method as that of leaves.

4. RESULTS:

4.1 STUDY OF LIFE CYCLE DURATION:

The life cycle of the eri silk worm during the months of March and April, 2014 were studied and little difference the larval instars' duration was observed which is depicted in the bar diagram below. Larvae took 27.5 days and 29.3 to form pupa which were grown on castor and kessuru respectively.

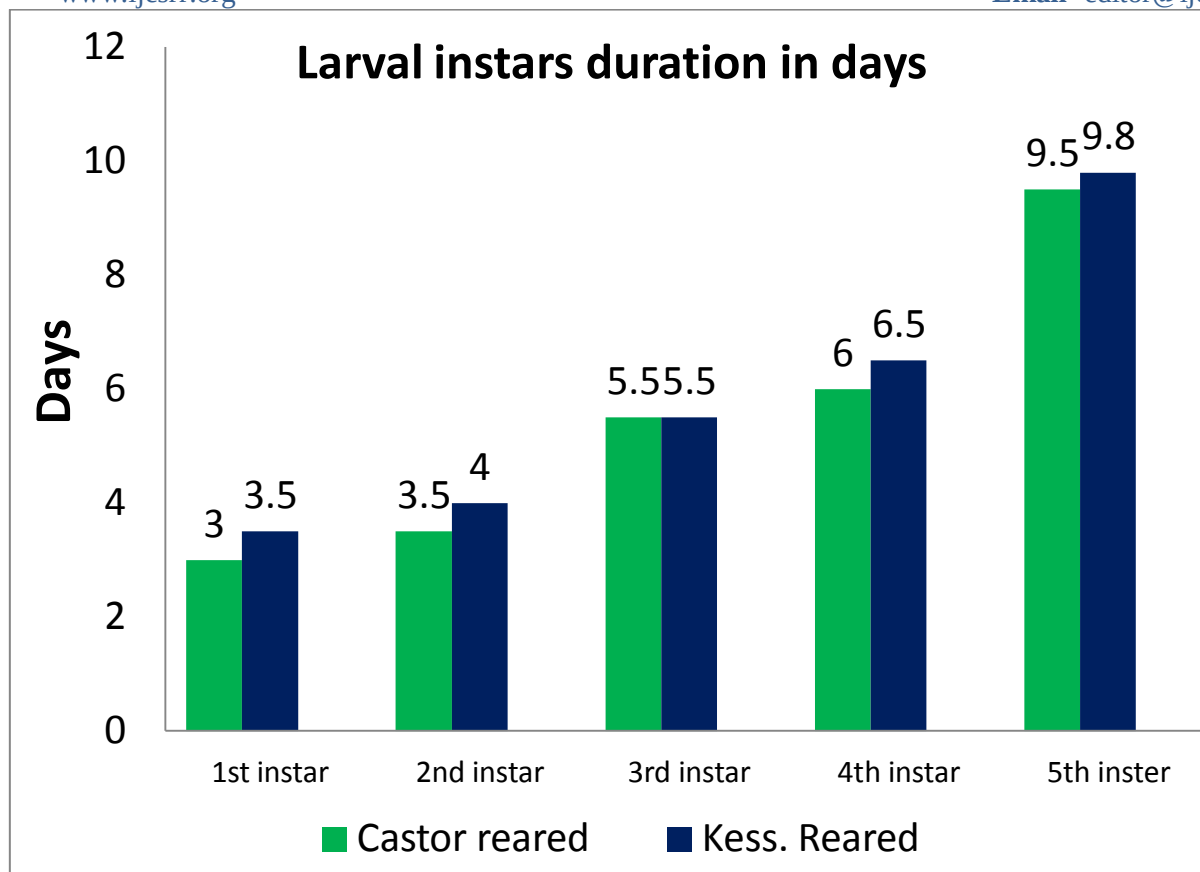


FIG: BAR DIAGRAM SHOWING THE DURATION OF LARVAL INSTARS REARED ON CASTOR AND KESSERU.

4.2 STUDY OF SOME OTHER LIFE CYCLE PARAMETERS:

Some life cycle parameters in the rearer's point of view, such as 5th instar Larval weight(gm), 5th instar Larval weight(gm), mean length of larvae (cm), Mean length of silk gland (cm), ERR, Cocoon weight (gm), Shell weight (gm) and Pupa protein (gm) were studied and are presented in the table below.

TABLE2: STUDY OF SOME LIFE CYCLE PARAMETERS OF ERI SILK WORM REARED ON CASTOR & KESSERU

Sl. No.	Studied parameter	Castor reared	Kesseru reared
1	5 th instar Larval weight(gm)	8gm	6.9gm
2	Mean length of larvae	8.1cm	7.4cm
3	Mean length of silk gland	106cm	104.2cm
4	ERR%	93.43%	86.47%
5	Average Cocoon weight	3.55gm	2.8gm
6	Average Shell weight	0.45gm	0.37gm
7	Pupa protein concentration (%)	13.95%	19.61%

4.3 PROTEIN AND CARBOHYDRATE CONCENTRATION OF CASTOR AND KESSERU LEAVES:

The Protein and carbohydrate concentration of castor and kesseru leaves presented as mg/ 100gm of dry leaves are stated in the chart below:

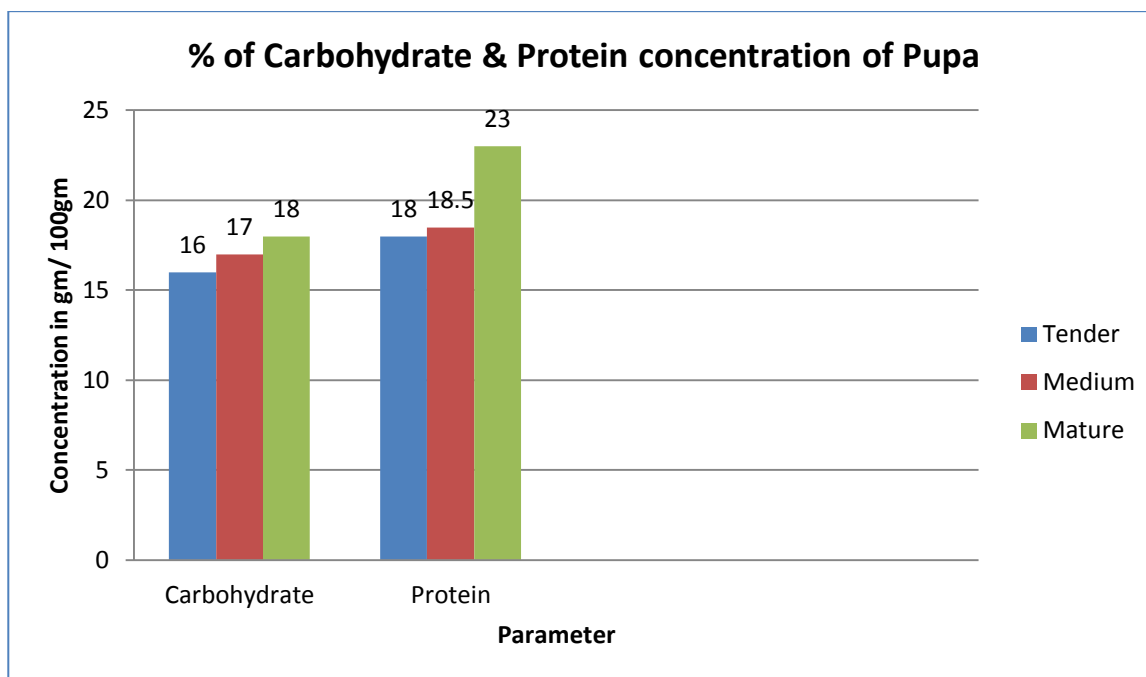


FIG: % OF PROTEIN AND CARBOHYDRATE CONCENTRATION OF CASTOR AND KESSERU LEAVES

5. DISCUSSION AND CONCLUSION:

Presently eri culture is spreading in all over India. Large scale rearing with castor leaf is difficult to manage and huge castor plantation invites hordes of native caterpillars that devour the entire plantation and recurring cost is more due to annual in nature. A food plant of permanent nature would make eri culture a stable crop for the rearers. From the experiment it was found that there is not much difference between the experimental parameters and the control. From the table 2 it is clear that though the rearing performances on castor are better than kesseru, yet the kesseru parameters are not so low to be discarded. Therefore, if eri silk worm is completely reared upon kesseru leaves it may be useful for the silk worm rearers, especially during the winter months when castor leaves are least available. Again, as stated earlier, the pupa of eri silk worm is used as delicacy by various ethnic communities of the entire North Eastern part of India. Therefore, they may act as a good source of cheaper protein for these people. From the pupal protein estimation it is seen that protein concentration is more in the kesseru reared pupae; which may be considered as better source of protein. Therefore, it can be concluded that eri silk worm can be reared on Kesseru leaves during scarcity of castor leaves.

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