



## Effect of Spirulina (Nutritional supplement) on rearing performance of Eri Silkworm (*Philosamia ricini*) in respect of some larval parameter

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Received:12.06.2015

Revised:21.09.2015

Accepted:25.10.2015

### Abstract

Spirulina is a blue-green microalgae. It contains 18 amino acids and vital vitamins like Biotin, Tocopherol, Thiamine, Riboflavin, Niacin, Folic acid, Pyrodozoic acid, Beta-carotene and Vitamin B12 etc. These nutrients are very easy to digest Protein (biliprotein) & Carbohydrates. Other different minerals and trace minerals, Beta-carotene, Chlorophyll, GLA Omega-3 fatty acid are also found in Spirulina. For this study we have conducted the experiments to know the effect of Spirulina (with different Concentration & dosages) on the rearing performance of Eri-silkworm *Philosamia ricini*. We have grouped the worms along with their control and then the experimental groups were treated with the different dosages of Spirulina specially to find the effect on the larval and cocoon parameter (Larval length, Larval weight). Then the collected datas were subjected to statistical analysis. All the results were found significant.

**Keywords:** Eri silkworm, larval parameter, nutritional supplement, *Philosamia ricini*, Spirulina

### Introduction

The reduction of rural poverty continues to be a paramount goal of the developing countries like India, so far various strategies (sericulture is most appropriate out of them) have been pursued to address this concern and rural employment creation is one of the major aspects. The global scenario clearly indicates the enormous opportunities for the Indian silk industry, because,

1. The India is the second largest producer of silk in the world.
2. The India has the unique distinction of being only country producing all the five commercially traded varieties of natural silks namely Mulberry, Eri, Muga, Tropical Tasar and Temperate Tasar
3. The India has distinct advantage of practicing sericulture all throughout year, yielding a stream of about 4-6 crops as a result of its tropical climate. Various researches have been carried out on the diet supplementation of mulberry leaves fed to silkworms. These supplementations include vitamins such as ascorbic acid, thiamine, niacin, folic acid and multivitamins (Etebari *et al.*, 2004).

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Its nutrients are very easy to digest protein (biliprotein), carbohydrates (mucopolysaccharides, rhamnose and glycogen), 50 different minerals and trace minerals, beta-carotene, chlorophyll, GLA omega3 fatty acid and many other nutrients. The presence of vitamins is appropriate for growth of larvae and the reproduction in many insects (Baker1975; Ritter and Johnson 1991; Levinson 1992; Ozalp and Emre 1992; Chang and Li 2004). Sericulture involves rearing of silk worm and production of silk. Silk is highly valued natural textile fiber of animal origin. No other fabric has fascinated man over millennia as silk. Silk obtained from sources other than mulberry are termed as Non Mulberry or Vanya silk (Eri, Muga, Tropical Tasar and Temperate Tasar). Eri silk is known as Non Violence or Ahinsa Silk (there is no need to kill the pupae inside the cocoon as in the case of other silk because the Eri silk is spun into thread like cotton). Monks in India prefer this silk due to non-violence silk. It is also said to be Poor person's silk because its cost of production is very less than other silk.

### The Eri silk is so popular because of following qualities

Texture of the Eri fabric is coarse, fine and dense, its thermal property, soft texture and moisture absorbent qualities. Eri silk is more durable and strong hence it is widely used in home furnishing.



Eri silk is produced by Eri silkworm *Philosamia ricini* feed on castor (*Ricinus communis*) leaves. The main focus of present study is on socio-economic development of rears of Eri silk worm because Eri culture provides following opportunity to rearers -

1. High employment potential.
2. Low gestations, High returns.
3. Women friendly occupation.
4. Ideal program for weaker section of society.
5. Eco friendly activity.
6. Satisfies equally concern.

In the present study, some experiments were carried to determine the effect of Spirulina (different concentration & dosages) on rearing performance of Eri silkworm (*Philosamia ricini*) for improve the Larval parameter (Larval length & Larval weight).

### Material and Methods

The Present study conducted in Zoology Department Govt. P.G. Madhav Science College, Ujjain. Department has a well-established and equipped sericulture Laboratory and well maintained Castor garden for nourishment of Eri silkworm. In the present study the insect were reared in the Sericulture laboratory on Castor plant leaves. Eggs of Eri silkworm were collected from Sericulture Rearing Centre Indore (M.P.), and reared for the purpose of these studies. The eggs were disinfected by the method described by Steinhaus (1949). Eri Silkworm rearing has been conducted for our research work by the standard rearing method which was adopted as recommended by Choudhary *et al.*, (1982). Our experiments design to study the qualitative effect of Spirulina (Blue Green Algae) on Larval Parameter (Larval length, larval weight) of Eri silkworm (*Philosamia ricini*). Spirulina capsules (Laurel Pharma, Bangalore) can purchase from market. Spirulina is dissolving in distilled water and diluted upto each into 100 ppm, 200ppm and 300ppm concentrations. Fifth instar larvae are dividing into 20 experimental batches including control, each group consisting 10 larvae. Five replications were maintained for each of the treatments. Fresh Castor leaves are soaked with aqueous extract of Spirulina and, then leaves were dried under fan before feeding to the silkworm till end of the fifth instar. My Study is designed for observes improvement in Larval parameter of Eri

silkworm (*Philosamia ricini*) in reference to profitability.

### Statistical analysis

The data were subjected to statistical analysis of variance for identifying significant differences among the treatments using standard method under MS Excel software. Significant tests were carried out using Dunnett's comparison method.

### Treatment details

#### Batches B1-B9 treated with Spirulina (Blue green algae)

B1, B2, B3 - 100ppm - once/day, Twice/day, Thrice/day -Respectively

B4, B5, B6 - 200ppm - once/day, Twice/day, Thrice/day-Respectively

B7, B8, B9 - 300ppm - once/day, Twice/day, Thrice/day-Respectively

**B10 – Control.** (Simple leaves without Spirulina).

### Results and Discussion

The Effect of various doses of Spirulina by different method of treatments on rearing perform of Eri silkworm (*Philosamia ricini*) on Larval Length and Larval weight are given in table 1 and 2 and fig. 1 and 2. The result of the present study correlates with Govindan *et al.*, 1988 that growth promoting effect of water soluble proteins and vitamins viz., B2, B6 and C are found in Spirulina and it is treated on silkworm biosduval with vitamins and amino acids enhance the larval weight and larval length. Therefore in the end, the study recommends that 300ppm concentration of aqueous solution of Spirulina as feed to silkworm found to effectively and increases larval weight and larval length. The specific dose of Spirulina with 300ppm concentration contain maximum amount of essential amino acid and vitamins which determines the specificity for various metabolic activities in silkworm. The Analysis of Variance has indicated high significant differences (at  $p = 0.01$ ) between the treatment values in respect of Larval weight, Larval Length are shown in Table-1 and 2. The treatment with 300ppm concentration spirulina has very significantly increased the larval weight and larval length when compared with control. Therefore, the 300ppm concentration has shown high impacts on the both larval characters. Secondly, the differences between 300 ppm



**Effect of Spirulina (Nutritional supplement) on**

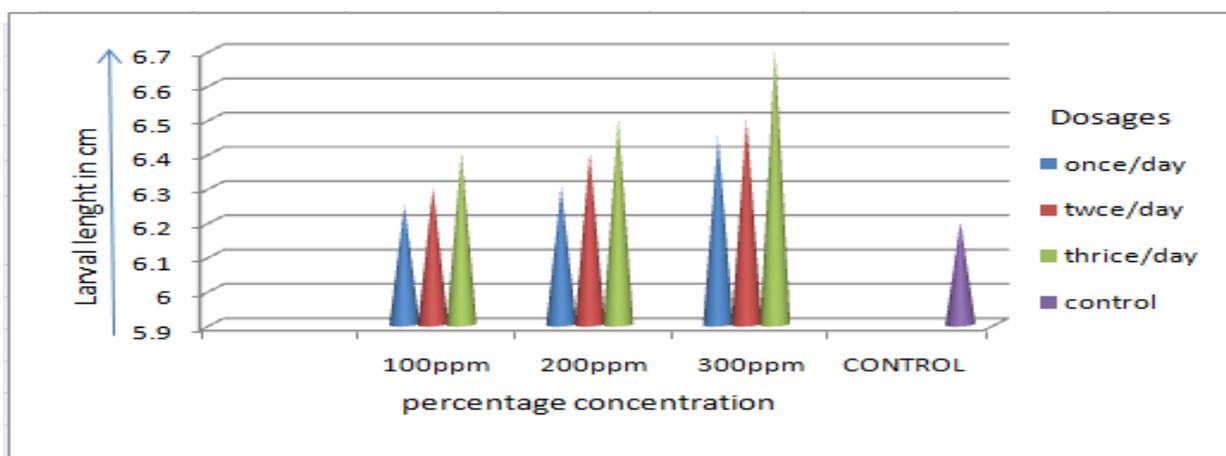
concentration and other two concentrations namely 100 and 200 ppm are also significant. The differences between 100 and 200 ppm the results as discussed indicates that the 300 ppm concentrations are also found to be significant in concentration treatment is found to be significant in respect of larval length & larval weight. Analysis of increasing the larval growth.

**Table No.1: The Effect of various doses of Spirulina by different method of treatments on rearing perform of Eri silkworm (*Philosamia ricini*) on Larval Length.**

Percentage Concentration / Dosage	once/day Larval Length(in cm)	Twice/day Larval Length(in cm)	Thrice/day Larval Length(in cm)
100ppm	6.25	6.30	6.40
200ppm	6.30	6.40	6.50
300ppm	6.45	6.50	6.70
CONTROL	6.20		

**Table No.2: The Effect of various doses of Spirulina by different method of treatments on rearing perform of Eri silkworm (*Philosamia ricini*) on larval weight.**

Percentage Concentration / Dosage	once/day Larval Weight (in gram)	Twice/day Larval Weight (in gram)	Thrice/day Larval Weight (in gram)
100ppm	7.20	7.25	7.30
200ppm	7.25	7.30	7.40
300ppm	7.30	7.50	7.60
CONTROL	7.20		



**Fig1. The effect of various doses of Spirulina by different method of treatments on rearing performs of Eri Silkworm (*Philosamia Ricini*) on larval length.**



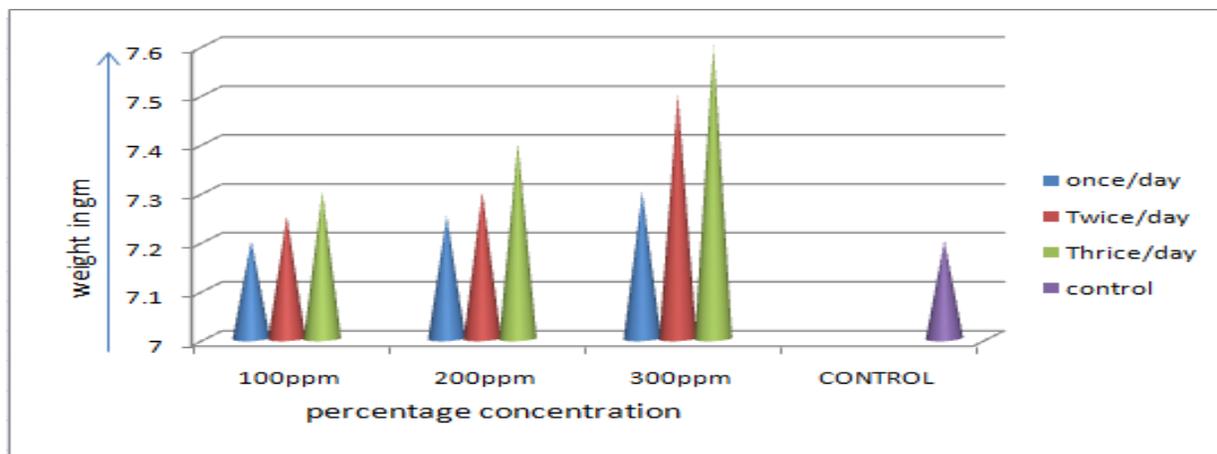


Fig 2. The Effect of various doses of spirulina by different method of treatments on rearing performs of Eri silkworm (*Philosamia ricini*) on larval weight

### Conclusion

Differences between the treatments were found significant in Larval characters (Larval length, Larval Weight) are significantly higher at 300ppm (B9) Trice/day concentration compared to control, 100ppm and 200ppm.

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