Ziziphus jujuba - a potential host of tropical Tasar silkworm

Antheraea mylitta - Kolhapurensis (Kavane) (Lepidoptera-Saturniidae) under Western Maharashtra condition

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ABSTRACT

The rearing of tasar silkworm, Antheraea mylitta kolhapurensis on the leaves of Ziziphus jujuba (Ber) reared under indoor rearing condition for the first time in India. It is a small deciduous tree or shrub reaching a height of 5–12 mt. (16–39 ft), usually with thorny branches. The leaves are shiny-green, ovate-acute, 2–6.5 cm. (0.79–2.76 in) wide and 1–3 cm (0.39–1.18 in) broad, with three conspicuous veins at the base, and a finely tooted margin. And it belongs to the Rhamnaceae plant family. It was observed that the ber is a potential host of tropical tasar silkworm. The growth parameters and cocoon characters of the tasar silkworm reared on ber leaves were normal. The tasar silkworm successfully lasted its life cycle ranged from 55 to 65 days. The effective rate of rearing, weight of pre-spinning larvae, cocoon, shell and pupae ranged from 20 to 30 per cent, 20 to 30 g, 8 to 10 g, 0.90 to 1.10g, 8 to 9 g, respectively. Parameters such as length of cocoon shell, peduncle, width of shell, peduncle, shell thickness etc. the fecundity ranged from 135 to 140 eggs. The finding of ber as a potential host for tropical tasar silkworm has developed for raw silk production.

Keywords: Indoor rearing, Tasar silkworm, Antheraea mylitta kolhapurensis, Ziziphus jujuba (Ber).

INTRODUCTION

Tropical tasar silkworm Antheraea mylitta kolhapurensis Bivoltine is known to infest ber crop in nature. The tasar silkworm A. mylitta Drury also called “vanya silkworm” is one of the commercially exploited silkworms reared outdoor. It is a polyphagus insect feeding on a number of food plants, like arjun, ain, sal, ber, etc. Among forty four ecoraces of A. mylitta are seen (Jolly, 1975). Indoor rearing of tasar silkworm A. mylitta on Terminalia catappa Cooke leaves used for its food and rearing potential 40 percent reported (Kavane & Sathe, 2007; Kavane, 2010; Kavane & Sathe 2011). Several workers have earlier reported positive response of A. mylitta different ecoraces for indoor rearing.

However, till no serious effort being made to study from chawki stage to the cocoon stage (Jayaprakash, 1993). The plant Ziziphus jujuba is also known as Ber, jujube. The Ziziphus jujube Pers. mostly found almost all parts of areas. The leaves used for hypoglycemic effects, reduction of sweetness judgements, as diuretic, emollient, expectorant, to promote hair growth, anticancer, sedative, blood purifier and in treatment of diarrhoea. Therefore, an attempt has been made to rear the insect from first instar to the last instar and allow for cocoon and adult formation on host food Ber.

Materials and Methods

Cocoon were collected from host plants Ber(Z. jujuba) from different parts of Kolhapur region during the first week of April to June and the adults were allowed to emerge under laboratory conditions at 28 ±2°C temperature, 75±5% RH and 12 hrs...

Newly hatched larvae were released on the leaves of the host plants Ber ( _Z. jujuba_ ) with the help of soft camel hairbrush. 8-10 such leaves with mounted larvae were placed in the plastic box size 27 cm x 6 cm x 7 cm in length, width, and height respectively. The maximum portion of edge of each leaf was available to the larvae for feeding; the box was perforated with numerous exits for aeration and with covered lid to prevent escape of the larvae. The rearing was conducted for two successive years with covered lid to prevent escape of the larvae. The result indicated that the rearing success of _A. mylitta_ kolhapurensis on Ber under indoor rearing conditions (28 ±2 °C and RH of 75 ± 5% and 12 hrs photoperiod) was 25 %.

The newly emerged brown in colour and fed on the left over chorion of the hatched eggs. The larvae were reared by providing tender Ber leaves. The larvae of all the five instars fed upon matured, tender leaves and successfully complicated the life cycle. The result indicated that the rearing success of _A. mylitta_ kolhapurensis on Ber under indoor rearing conditions (28 ±2 °C and RH of 75 ± 5% and 12 hrs photoperiod) was 25 %.

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### Results and Discussion

It was observed that there was less mortality of Ist instar _A. mylitta_ kolhapurensis worms when fed with tender Ber leaves. The larvae of all the five instars fed upon matured, tender leaves and successfully complicated the life cycle. The result indicated that the rearing success of _A. mylitta_ kolhapurensis on Ber under indoor rearing conditions (28 ±2 °C and RH of 75 ± 5% and 12 hrs photoperiod) was 25 %.

#### Table 1. Cocoon characters of indoor reared tasar silkworm _Antheraea mylitta_ kolhapurensis on Ber

<table>
<thead>
<tr>
<th>Crop</th>
<th>Cocoon wt.(gm)</th>
<th>Shell wt.(gm)</th>
<th>Length of shell (cm)</th>
<th>Width of shell (cm)</th>
<th>Shell Thickness (mm)</th>
<th>Shell ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First year-2014</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>June-July</td>
<td>8.45</td>
<td>0.95</td>
<td>3.40</td>
<td>2.10</td>
<td>0.48</td>
<td>11.24</td>
</tr>
<tr>
<td>Dec.-Jan.</td>
<td>9.15</td>
<td>1.10</td>
<td>3.90</td>
<td>2.15</td>
<td>0.45</td>
<td>12.02</td>
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<tr>
<td><strong>Second year-2015</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>June-July</td>
<td>8.64</td>
<td>0.94</td>
<td>3.26</td>
<td>2.10</td>
<td>0.46</td>
<td>10.87</td>
</tr>
<tr>
<td>Dec.-Jan.</td>
<td>9.10</td>
<td>1.22</td>
<td>3.33</td>
<td>2.25</td>
<td>0.50</td>
<td>13.40</td>
</tr>
</tbody>
</table>
twigs of Ber plant. The first instar measured 0.7 to 0.9 mm in length with a mean of 0.8 mm and 1.2 to 1.4 mm with an average of 1.2 mm in width at head capsule. The first instar occupied 3.5 days. The larvae that settled for the first moult were separated and kept undisturbed for moulting. From the second instar onwards, the body colour of the larvae changed to green. The second instar measured from 1.6 to 1.8 cm in length with a mean of 1.7 mm, while at the head capsule the width ranged from 1.3 to 1.4 mm with a mean of 1.4 mm. The second instar occupied 2.5 days. Immediately after the second moult, 3rd instar larvae were transferred to the twigs of Ber.

The third instar larva measured 2.3 to 2.6 cm with a mean of 2.4 cm and the width at the head capsule ranged from 2.1 to 2.2 mm with an average of 2.2 cm. This instar lasted for 4 days. Fourth instar onwards the larvae fed voraciously and defoliated the leaves. The fourth instar ranged from 4 to 5 cm with a mean of 4.5 cm in length, while at the head capsule it measured from 4 to 5 mm in width with a range of 5.1 mm. The fourth instar lasted for 5 to 6 days. The fifth instar larvae fed for a duration ranging from 6.5 to 7.5 days. The larva measured from 6 to 7.5 cm with a mean of 6.7 cm in length, while the width at head capsule ranged from 5 to 6.5 mm with an average of 5.8 mm. The fifth instar single larval weight varied between 20 g and 30 g with an average of 25 g. The total larval duration ranged from 30 to 32 days. The effective rate of survival was as 25-30 per cent. At the end of the larval period the ripe tasar larvae were released on the montages for cocoon construction on which cocoons were constructed. It was very interesting to note that the female cocoons measured on an average 4.1 cm and 4.4 cm, while male cocoons measured 3.2 and 3.9 in length and width respectively. The number of eggs laid by an individual female moth varied between 135 to 140 with a mean of 140 eggs per female. The adults survived for 3 to 4 days. The silkworms could be successfully reared indoors complete the life cycle. There have been no reports on the feeding habits of tasar silkworm on Ber, a potential alternate host plant. The present finding has firmly established that the tropical tasar silkworm *A. mylitta kolhapurensis* could be reared indoor on Ber leaves. The obstacles in traditional outdoor rearing of *A. mylitta* on naturally grown on trees can be overcome only through adopting indoor rearing on Ber leaves.

*A. mylitta kolhapurensis* is potential wild silkmoth to be used in sericulture business. However at present rearing success of this species is about 30 %. Hence there is need to standardize the rearing technique of *A. mylitta*. Secondly, *A. mylitta* is having 44 ecoraces with different rearing potential. *A. mylitta kolhapurensis* is reported for the first time from Kolhapur, India as subspecies of *A. mylitta*. Therefore, it is very interesting to know the rearing potential of this subspecies, rearing potential of this species have been tested on badam and found 45% rearing success which is greater than previously
recorded ecoraces of *A. mylitta*. The above subspecies has been published by Kavane & Sathe (2009) as variety of *A. mylitta*.

Shamitha (2007) attempted total indoor rearing of tasar silkworm *A. mylitta*. Tasar culture is a forest based industry best suited to the economy and social structure of developing countries like India.

Recently, Kavane and Sathe (2007) studied indoor rearing of *A. mylitta* on a host plant *T. catappa* a tertiary food plant of wild silkmoth. The rearing
success of *A. mylitta* sub sp. *kolhapurensis* on *T. catappa* under laboratory conditions (28 ±2 °c, 65 - 70 % R.H. and 12 hrs. photoperiod) was 45%.

According to Kavane & Sathe (2007, 2009, 2010, 2011) silkworms were adopted for indoor rearing technique by preparing no peduncle which is normally spun by the worms in outdoor rearing is, outstanding feature of the success of indoor rearing technique. In the present study, the Ber potential host of tasar silkworm, *A. mylitta kolhapurensis* will open new vistas in tropical tasar culture and will help in boosting up of tasar silk and all parts of the Ber can be used medicinally and it has a long tradition in alternative medicine (Herbert L. et.al.1975). The leaves used for hypoglycemic effects, reduction of sweetness judgements, as diuretic, emollient, expectorant, to promote hair growth, anticancer, sedative, blood purifier and in treatment of diarrhoea.

**Conflict of Interests**

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**References**


