

Economics of *Buchanania lanzan* (spreng) as a choice food plant of tropical Tasar silkworm, *Antheraea mylitta* d. (DABA TV).

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ABSTRACT

Tasar culture is being practiced in Vidarbha region of Maharashtra traditionally, in the districts, Bhandara, Gondia, Chandrapur and Gadchiroli. The plants, *Terminalia tomentosa*, *Terminalia arjuna* as primary host and other six secondary host plants of *A. mylitta* available in high density. The rearing performance of *A. mylitta* using *Buchanania lanzan* (Spreng) with *Terminalia tomentosa*, *Terminalia arjuna* have been evaluated. Being a polyphagous in nature, tasar silkworm, *A. mylitta* was reared on *Buchanania lanzan* as a secondary choice food plant and compared with *T. tomentosa*, *T. arjuna*. Fifth instar larval weight was lowest when fed with *B. lanzan*, whereas larvae fed with *T. tomentosa* and *T. arjuna* weighed $21.786 \pm 0.245\text{g}$ and $21.196 \pm 0.469\text{g}$ respectively during winter. Cocoon weight and pupal weight was also higher with *T. arjuna* followed by *T. tomentosa*, while in larvae fed with *B. lanzan* it was $7.047 \pm 0.313\text{g}$ and $6.048 \pm 0.271\text{g}$ respectively. The shell weight, shell ratio was also higher with primary food plant as compared to secondary food plant. As well as the leaf moisture content and other parameters of primary host plant was always superior over secondary host plant

Keywords: Tasar silkworm, *Antheraea mylitta*, *Buchanania lanzan*, *Terminalia tomentosa*, *T. arjuna*.

INTRODUCTION

Tasar culture is being practiced in Maharashtra from tribal districts, Bhandara, Gondia, Chandrapur and Gadchiroli from several years. Tasar silk moth is semi-domesticated owing to the fact that only grainage operations are conducted indoor and reared outdoor. It is polyphagous, trivoltine reared in three different seasons throughout the year. The food plants, *Terminalia tomentosa*, *Terminalia arjuna* as primary host and other six like *Lagerstroemia parviflora*, *Zizyphus mauritiana*, *Anogeissus latifolia*, *Syzigium cumini*, *Careya arborea* and *Hardwickia binata* are secondary host plants of *A. mylitta* available in high density.

Buchanania lanzan is a tree cultivated across India, primarily in the northwest which produces the seeds known as *charoli*. This plant also scattered in Gondia and Bhandara district and easily available in selected rearing site therefore which was utilized as a secondary food plant for feeding to *A. mylitta* to evaluate the various economic parameter of larval and cocoon characters. Host plants influence the weight gain by larva, survival percentage, growth index, pupal weight, adult emergence, and fecundity. [1-3] The leaf nutrition of tasar food plant can enhance the effective rate of rearing (ERR), health & growth of larvae and better crop yields as the feed quality has direct correlation with cocoon & shell weights, silk ratio and silk filament.[4-5] In present study evaluation of different food plants with respect to cocoon crop and economic cocoon prospective of *A. mylitta* fed on primary and secondary food plant during winter season.

METHODOLOGY

The present work has been selected to evaluate and economics of the secondary food plant *Buchanania lanzan* on rearing and cocoon parameter of *A. mylitta* ecorace Daba (TV) as compare to primary food plant *Terminalia tomentosa* and *T. arjuna* (Fig. A, B and C). Study has been carried out in the Arjuni/Morgaon rearing site of Gondia district of Maharashtra, India during third rearing cycle in the winter season. Third rearing cycle consist from the month of November, 2015 to January, 2016. Disease free laying (dfles) of *A. mylitta* were collected from Arjuni/Morgaon Grainage

Centre of Directorate of Sericulture Maharashtra for rearing. Newly moulted nine hundred 3rd instar larvae were transfer on *T. tomentosa*, *T. arjuna* and *B. lanzan* in same quantity till the cocoon formation. Evaluated the larval duration, larval weight, cocoon weight, pupal weight, shell weight, shell ratio as well as also evaluate the leaf moisture content of different host plants. Experiment was replicated in triplex by using 100 number of tasar silkworm larvae for each group and each replication. During rearing data were recorded and analyze statistically.

RESULTS

The data represented in Table 1 indicates the comparative rearing performance and cocoon parameters of Daba Ecorace (TV) reared on primary food plant *T. tomentosa*, *T. arjuna* and secondary food plants *B. lanzan*. The total larval duration were recorded from third instar to fifth instar, it was 48, 46 and 44 days of larvae fed with *T. tomentosa*, *T. arjuna* and *B. lanzan* respectively.

Fifth instar larval duration was 18 days, 17 day and 15 days when fed with *T. Tomentosa*, *T. arjuna* and *B. lanzan* respectively. The weight of late fifth instar larva fed on *T. Tomentosa*, *T. arjuna* and *B. lanzan* it was $21.786 \pm 0.245\text{g}$, $21.196 \pm 0.469\text{g}$ and $20.220 \pm 0.171\text{g}$ respectively. Higher average cocoon and pupal weight was recorded when larvae fed with *T. arjuna* as compare to *T. tomentosa* and *B. lanzan* it was $8.886 \pm 0.393\text{g}$; $7.307 \pm 0.352\text{g}$, followed by *T. tomentosa* $8.761 \pm 0.406\text{g}$; $7.056 \pm 0.304\text{g}$ and *B. lanzan* $7.047 \pm 0.313\text{g}$; $6.048 \pm 0.271\text{g}$ during winter season (Table 1; Fig. 3).

The least shell weight and shell ratio was recorded where larvae fed on choice food plant *B. lanzan* it was $0.848 \pm 0.114\text{g}$ and 12.04 % as compare to primary food plant *T. tomentosa*, $1.139 \pm 0.071\text{g}$ and 13.23 % and *T. arjuna* $1.096 \pm 0.098\text{g}$ and 12.45 %. As well as the higher leaf moisture content was recorded in *T. tomentosa* followed by *T. arjuna* and *B. lanzan* it was 64.46, 63.87 and 54.51 % respectively (Table 1; Fig. 4).

DISCUSSION

In the present study larvae fed with *B. lanzan* performs negatively as compare to larvae fed with *T.*

tomentosa and *T. arjuna*, in relation to larval duration and cocoon economic parameters like cocoon weight, single shell weight, shell ratio percentage. Overall performance of *A. mylitta* was found superior on *T. tomentosa* than *T. arjuna*, *S. robusta*, *Z. Jujube*, *L. parviflora* and *A. latifolia* . [4]

The success of tasar culture is mainly depends on the accessibility of food plant and their leaf nutritional status as the consequent silkworm larval rearing on them could result to higher number of cocoons or the cocoons of superior quality in terms of pupation or silk content.[6]

Table: 1. Economic parameters of cocoon of *A. mylitta* and leaf moisture content of different food plants during winter crop.

Sr. No.	Parameters	Name of food plants		
		<i>T. tomentosa</i>	<i>T. arjuna</i>	<i>B. lanzen</i>
1	Larval duration (days) (3 rd to 5 th instar)	48	46	44
2	5 th instar larval duration (days)	18	17	15
3	5 th instar larval weight (g)	21.786 ±0.245	21.196±0.469	20.249±0.171
4	Pupal weight (g)	7.056±0.304	7.307±0.352	6.048±0.271
5	Cocoon weight (g)	8.761±0.406	8.886±0.393	7.047±0.313
6	Shell weight (g)	1.139±0.071	1.096±0.098	0.848±0.114
7	Shell ratio (%)	13.23±0.980	12.45 ±1.125	12.04±1.439
8	Leaf moisture content (%)	64.64	63.87	54.51



Fig. A - C Host plants of Tasar Silkworm, *A. mylitta* A. *Buchanania lanzan* ; B. *Terminalia tomentosa*; C. *Terminalia arjuna*

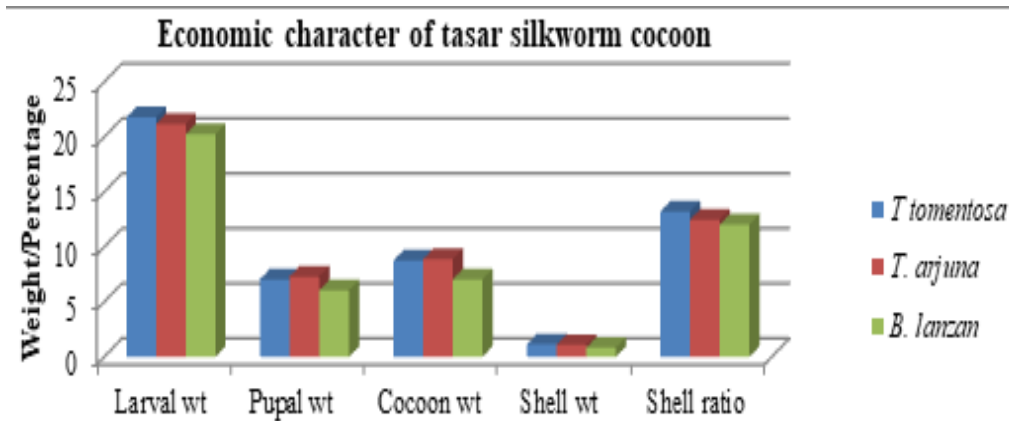


Fig. 3 : Economic traits of tasar silkworm on different host plants

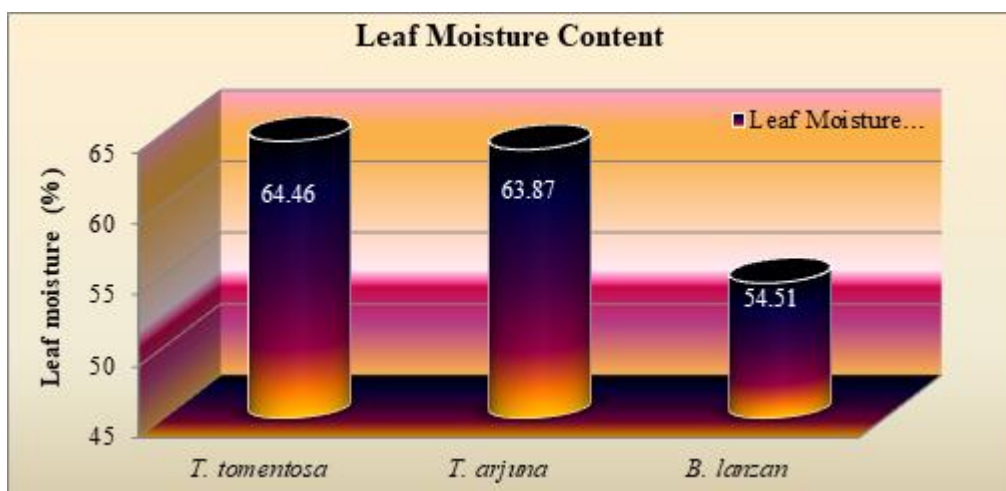


Fig. 4 : Leaf moisture contents in different food plants

The larval span extension might be either due to low nutrition levels or less leaf succulence. Even the low leaf moisture content in *B. lanzan* might made the tasar silkworm not to attain its required growth and maturity as like on *T. arjuna* and *T. tomentosa* food plants to formation of hamack and to advance its life cycle at rapidly.

A. mylitta produced best quality of cocoon when their larval fed on food plant *T. tomentosa* as compared to *T. arjuna*, *T. cattappa* and *Z. jujube* in different season. [7-8]

Least leaf moisture content observed in *B. lanzan* as compare to *T. Tomentosa* and *T. arjuna*. Therefore it gives adverse effect on larval duration and cocoon parameters during rearing. The leaf moisture content was having positive correlation with silkworm rearing performance. [9-10]

CONCLUSION

In the present investigation it can be concluded that the rearing of tasar silkworm, *Antheraea mylitta* on *B. lanzan*, which is not included under primary food plant group till date, the valuable and profitable rearing on *T. tomentosa*, and *T. arjuna*, the primary food plants. The least leaf moisture content in the *B. lanzan* were recorded as compared to basic primary food plant species, which is desirable for the healthy growth of silkworm larvae and better cocoon production. Again, the present experimental finding does not suggest *B. lanzan* for tasar silkworm rearing. However, mass rearing try out first at farmer's level is needed before recommending same species for tasar silkworm rearing, commercially.

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Conflicts of interest: The authors stated that no conflicts of interest.

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