

COMPARATIVE STUDY OF TWO SILKWORM SPECIES IN AMBIKAPUR, SURGUJA DISTRICT, CHHATTISGARH FOR QUALITY YIELD

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ABSTRACT

Darima is a Village in Ambikapur Tehsil in Surguja District of Chattisgarh State, India. It is located 17 KM towards South from District head quarters Ambikapur. Surrounded by Lakhanpur, Mainpat, Batauli and Lundra Tehsil. Local Language is (Sargujhiya) Chhattisgarhi, Total population is 2824 and number of houses are 620. Female Population is 48.9%. Village literacy rate is 60.3% and the Female Literacy rate is 26.9%. per acre total expenditure, annual return and net profit of tassar and mulberry sericulture onwards the total Annual cost of establishment of culture for the crop of tassar was 18,200 and mulberry 54400. After the final crop cocoon prize Returns in respectively tassar (75,000) and mulberry (105000). Net Profit of tassar sericulture was 56800 and mulberry culture profit was 50600.

KEYWORDS: *Sericulture, Production, Profit, Annual Expenditure.*

INTRODUCTION

Chhattisgarh is one of the youngest States of the Indian nation. Constituted on 1st November, 2000, Chhattisgarh is located in the heart of India, and shares its borders with six States of the country; Uttar Pradesh to the north, Jharkhand to the north-east, Orissa to the east, Madhya Pradesh to the west and north-west, Maharashtra to the south-west and Andhra Pradesh to the south-east. Chhattisgarh is situated between 17 to 23.7 degrees north latitude and 8.40 to

83.38 east longitude. The climate of Chhattisgarh is mainly tropical, humid and sub-humid. Chhattisgarh in view of its favourable climatic conditions could be converted into Silkworm gene bank for sustaining the sericulture of the whole world. Chhattisgarh state is known for producing silk of international quality. Being one of the traditional agro based industries of the state, producing high quality silk comparable to international quality helps in improving the economic condition of the landless farmer and weaker sections of the society and providing employment opportunities during pre and post cocoon activities.

Silk fibre is protein produced from the silk glands of silkworms. Sericulture is an important employment generating, agro based, export oriented, commercial activity, falling under cottage and small scale sector, practiced in various countries, since playing an important role in poverty alleviation, generating employment in rural areas and helping in percolating economy from rich to poor (Singh *et. al.* 2017). The woman plays a vital role from production to consumption of silk. Industry provides useful employment in the activities such as, mulberry cultivation, silkworm rearing, reeling, spinning, weaving, printing, finishing and processing of silk fabrics (Patel *et.al.* 2017). There are many more ancillary activities encompassing the sericultural activity such as silkworm seed production, fabrication of rearing appliances, production of organic manures, development of irrigation methods, fabrication of garden mechanics, waste silk units, by-product utilization units.

The technique of silk production is known as sericulture. It is an agro industry and is playing an important role in the economic development of silk rearing pockets of rural India providing gainful occupation to 64 lakh persons. One hectare of Mulberry generates employment of about 12 man years and family members ranging in age between 18 to 60 years can engage themselves in various sericulture activities, such as, cultivation of food plants Mulberry, castor etc., silkworm rearing, egg production, silk reeling, weaving etc.

The intensity of natural enemies was very noticeable during July to February of the year whereas some of them observed damaging cocoons in open forest during rainy, winter and summer seasons. Tasar culture is a forest-based activity practiced by poor and tribals of India. *Antheraea mylitta* is a wild sericigenous insect which produce highly economic important silk. India rank second among the tasar producing countries of the world after China. Presently country is producing about 28708 MT of silk including mulberry and Vanya silk (wild silk). Mulberry silk share is 74.51% (21,390 MT), Tasar 8.48% (2,434 MT), Eri 16.46% (4,726 MT) and Muga 0.55% (158 MT) (CSB, 2015). In Maharashtra, very few

sections of the society are well acquainted with tasar and mulberry silk production (Sathe and Jadhav, 2000, Jadhav *et al.*, 2013, 2014).

Tasar culture in India is an ancient traditional practice of tribes and people of weaker section residing in hilly areas. It is practised by nearly 1.5 lakh families in different states viz. Jharkhand, Chhattisgarh, Orissa, West Bengal, Bihar, Maharashtra, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh. Jharkhand ranks first among the tasar producing states with a contribution of about 60-65% of country's production and Chhattisgarh ranks the second. The quality of tasar food plants used for rearing is one of the most contributing factors for production of excellent and remunerative tasar crops. Survey studies or estimation of number of species per unit of land area are therefore, necessary to construct life tables and for nearly all other studies related to population dynamics of the species in the field conditions. Review of literature indicates that, several workers worked on natural enemies of silkworms from different parts of the world. Notable among them is (Jadhav *et al.* 2014). Many workers have worked in past for survey surveillance of natural enemies of *A. mylitta*. (Jolly and Chandrashekharai, 1982; Jadhav *et al.* 2013).

Tropical tasar culture is practiced in nine states viz. Jharkhand, Bihar, Chhattisgarh, Madhya Pradesh, Orissa, Uttar Pradesh, West Bengal, Maharashtra and Andhra Pradesh. The tasar Silkworm is a polyphagous (Jolly *et al.*, 1974) insect and feeds on many food plants and is reared on nature grown trees in the forest and on block plantation in the farms by the tribal's and other farmers. During the present investigation a comparative study will be done to evaluate Arjun (*Terminalia arjuna*) and Aasan (*T. tomentosa*) of tasar silkworm, *Antheraea mylitta*.

Mulberry, *Morus alba* L. (Urticales Moraceae) is the sole food plant for silkworm, *B. mori* and hence its cultivation is an essential part of sericulture. For the development of silk industry, production of quality silkworm cocoons is must. To achieve the production goal of good quality silkworm cocoon crop, certain factors play important role, mulberry leaf (38.2%), climate (37.0%), rearing techniques (9.3%), silkworm race (4.2%), silkworm egg (3.1%) and other factors (8.2%) in producing good quality cocoons. Hence mulberry leaf quality as well as quantity is one of basic prerequisites of sericulture and play a pivotal role for successful silkworm cocoon crop.

The food plant of silkworms is Mulberry for producing Mulberry silk. Tasar silk producing silkworms feed on *Terminalia tomentosa*, and *Terminalia arjuna*. Similarly, Muga silk producing silkworms feed on scalu or Som; Eri silk producing silkworms feed on castor. The demand for silk has always been high for a variety of fabrics ranging from sarees to shirting etc. Natural silk faces competition from artificial silk which is imported but consumers having set preferences for natural silk are not easily weaned away by artificial silk. Besides indigenous demand, there is a huge export demand and Indian silk is popular all over the world. Silk earns considerable foreign exchange for the country.

From insect group, stink bug, praying mantis, wasps and red ants were noticed as a potential predator while ichneumonids, braconids and uzi flies were prominent parasitoids damaging silkworms. As regards to vertebrates, rat snake, garden lizard, birds like bulbul, jungle crow and Indian myna found commonly predating on *A. mylitta*. It was interesting to note that, in the months of June /July with first crop birds like bulbul, Indian sparrow found to be most dangerous predators for early stages of *A. mylitta*, it may be due to scarcity of natural food, weed and seeds of plants. From the mammalian group mice, rat and squirrel observed as active natural enemies in this area.

MATERIALS AND METHODS

The Sarguja district has considerably diversity in its soils, physiographic, land use pattern and cropping system. The district has mixed topography comprising of plain land valleys and hills. The soils of district vary in texture from loam to sandy loam, acidic and non-calcareous and moderate to high in organic matter. The Beas, one of the districts largest rivers, contributes much to the fertility of land but due to the hilly terrain, not much of it is cultivated. The whole district is full of uniform patches of barren land, interspersed with small forests. Even so, the economy consists mostly of agriculture and farming, with tea cultivation in particular contributing a vital role in the revenue.

**Fig. 1. Plantation at Ambikapur****Fig. Preparation and plantation at Darima**

The present study was carried out stretching over a period of about 2 Month or one culture session of tassar and mulberry on the field. Interview (focused) and observation (participant and non-participant) were also other tools for primary data collection. Efforts were made to interview the head or senior most of the Sericulture centre respondents, Sample for the present study was selected from 2 predominated Tassar and mulberry culture centre at Ambikapur and Darima Silk Board Sarguja,. Interview technique was mainly adopted for the collection of data. Few statistical parameters were effectively use.

Qualitative and quantitative data analyses were used in the study. Percentages, frequencies, and weighted means were used in the analysis. Cost and returns estimates were used to evaluate the financial performance of the farms. Measures such as net returns, return to labour, material costs and returns on investment were employed. Net return was computed as Gross Income minus Total Expenses (Variable and Fixed Cost). Fixed costs included depreciation of equipment, facilities, rentals and realty taxes, while variable costs included hired labour, family labour, materials and cost of capital involved in the operations. Data on total cost was based on the average of years farmers had conducted rearing. Farm gate price was based on the average selling price of products prevailing in the area

RESULT AND DISCUSSION

1. General feature of Tassar and Mulberry Sericulture

Comparative analysis of tassar and mulberry sericulture in Table 1 .The tassar is mainly wild or outdoor crop, only 28-30 day life span, per annum during the February to August month 1 or 2 crop possible in this region, low cost, more productivity, higher profitability, low disease risk and fast recover performance. And Mulberry is mainly building or indoor crop, 40-45 day life span, per annum during the January to December month 3 or 4 crop possible in this

region, high cost, light cocoon weight but productivity is more, medium profitability, high disease risk and low recover performance comparison to tassar culture. The reasons of less productivity and profitability were mainly some pest, fertilizer, bacterial, viral diseases and some predators.

2. Cost of Sericulture/acre (First Crop) Table 02 and Fig 03 Shows per acre expenditure during the first crop of tassar and mulberry onwards more expenditure was incurred towards for Equipment charges (5,500), Ploughing operation (1200), Cost of egg (300), final land preparation (200), plant protection and cutting (1500), making trenches with tractor (500), fertilizer (500), fertilizer application charges (200), Irrigation (2000), Hoeing/weeding charges (1000) miscellaneous expenditure (300) per acre. And mulberry crop more expenditure was incurred towards for Equipment charges (24,500), Ploughing operation (1500), Cost of egg (500), final land preparation (400), plant protection and cutting (3000), making trenches with tractor (2200), fertilizer (1036), fertilizer application charges (120), Irrigation (1500), Hoeing/weeding charges (1800) miscellaneous expenditure (500) per acre.

3. Cost of Sericulture/Acre (Second & Third Crop) Table 03 and Fig. 4 shows cost of sericulture during second and third crop of tassar and mulberry crop onwards more expenditure was incurred towards for Equipment charges (500), Ploughing operation (600), Cost of egg (300), final land preparation (200), plant protection and cutting (500), making trenches with tractor (200), fertilizer (200), fertilizer application charges (200), Irrigation (1000), Hoeing/ weeding charges (1000) miscellaneous expenditure (300) per acre. And mulberry crop more expenditure was incurred towards for Equipment charges (2500), Ploughing operation (1100), Cost of egg (500), final land preparation (400), plant protection and cutting (2000), making trenches with tractor (2200), fertilizer (1000), fertilizer application charges (400), Irrigation (4500), Hoeing/ weeding charges (1800) miscellaneous expenditure (500) per acre.

4. Net Profit of Sericulture Table 04 and Fig.5-7 shows per acre total expenditure, annual return and net profit of tassar and mulberry sericulture onwards the total Annual cost of establishment of culture for the crop of tassar was 18,200 and mulberry 54400. After the final crop cocoon prize Returns in respectively tassar (75,000) and mulberry (105000). Net Profit of tassar sericulture was 56800 and mulberry culture profit was 50600.

Table 1: General feature of Tassar and Mulberry Sericulture.

S.N.	General feature	Tassar	Mulberry
1	Cost of culture	Low	High
2	Profit	High	Low
3	Life span	28-30	40-45
4	Productivity	High	Low
5	Crop in year	1-2	3-4
6	Crop side	Outdoor	Indoor
7	Cocoon average weight	10-11 gram	5-6 gram
8	Crop session	February-August	January-December
9	Disease risk	Low	High
10	Silk colour	Golden Yellow	Light White
11	Thread Thickness	Thick	Thin

Table. 2. Cost of Sericulture/acre (First Crop).

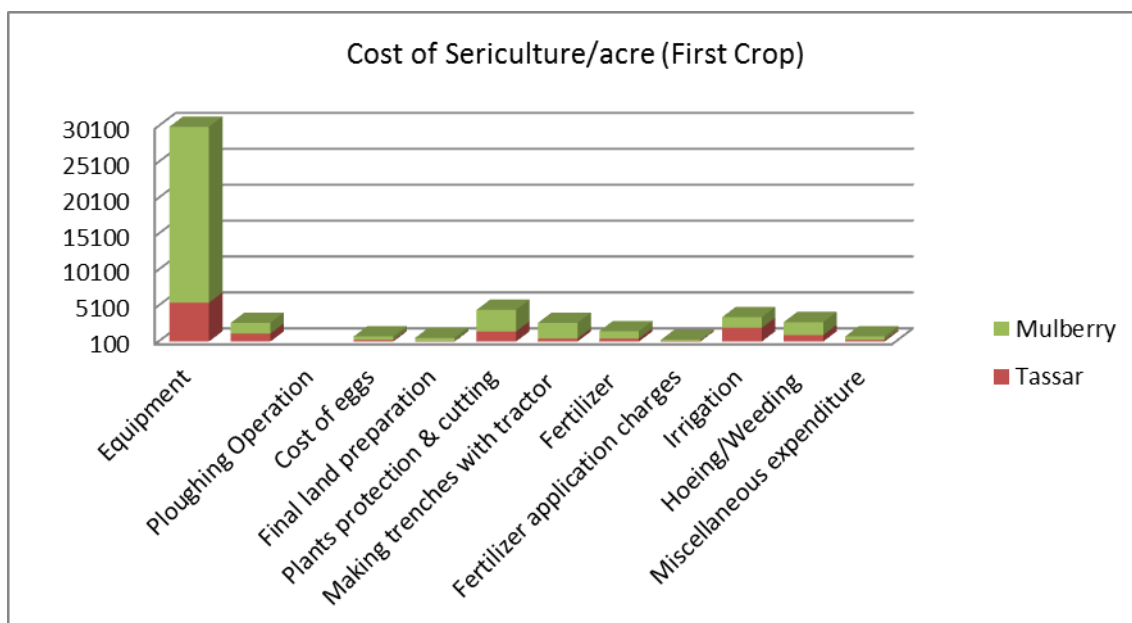
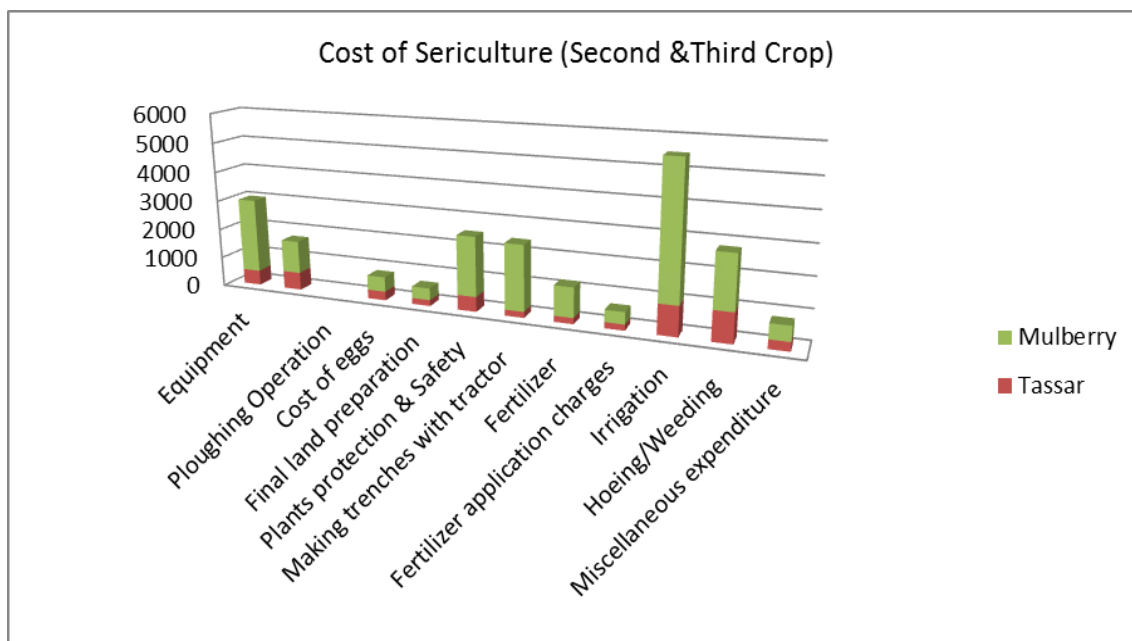
S.N.	Cost of Sericulture	Tassar [Rs.]	Mulberry[Rs.]
1	Equipment	5500.00	24500.00
2	Ploughing Operation	1200.00	1500.00
3	Cost of eggs	300.00	500.00
4	Final land preparation	200.00	400.00
5	Plants protection & cutting	1500.00	3000.00
6	Making trenches with tractor	500.00	2200.00
7	Fertilizer	500.00.	1036.00
8	Fertilizer application charges	200.00.	120.00
9	Irrigation	2000.00	1500.00
10	Hoeing/Weeding	1000.00.	1800.00
11	Miscellaneous expenditure	300.00.	500.00
Total		13,200.00	37,500.00

Table.3. Cost of Sericulture/Acre (Second & Third Crop).

S.N.	Cost of Sericulture	Tassar [Rs.]	Mulberry[Rs.]
1	Equipment	500.00	2500.00
2	Ploughing Operation	600.00	1100.00.
3	Cost of eggs	300.00	500.00
4	Final land preparation	200.00	400.00
5	Plants protection & Safety	500.00	2000.00
6	Making trenches with tractor	200.00	2200.00
7	Fertilizer	200.00	1000.00
8	Fertilizer application charges	200.00	400.00
9	Irrigation	1000.00	4500.00
10	Hoeing/Weeding	1000.00	1800.00
11	Miscellaneous expenditure	300.00	500.00
Total		5,000.00	16,900.00

Table.4. Net Profit of Sericulture.

S.N.	Net Profit	Tassar [Rs.]	Mulberry[Rs.]
1.	Annual Expenditure	18200.00	54400.00
2.	Return	75000.00.	105000.00
3.	Net Profit	56,800.00	50,600.00

**Fig.3. Cost of Sericulture/acre (First Crop).****Fig.4. Cost of Sericulture (Second &Third Crop).**

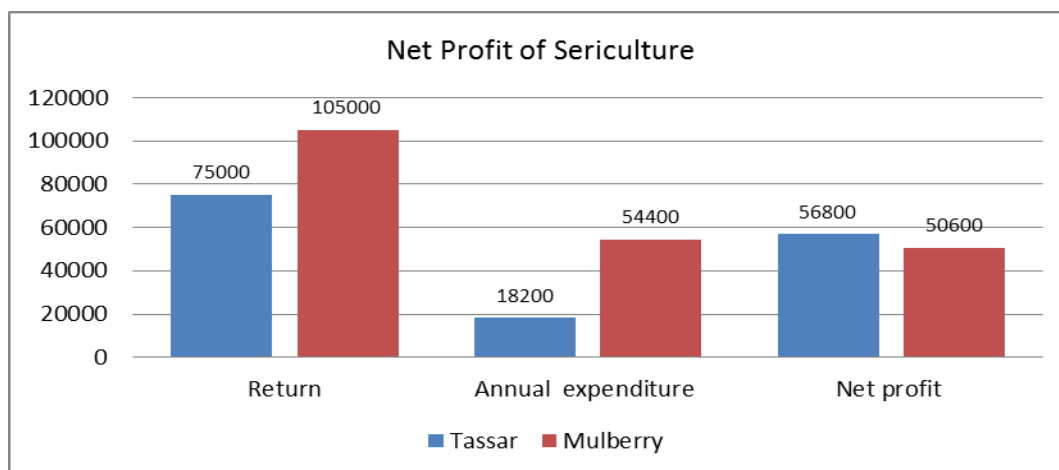


Fig. 5. Net Profit of Sericulture.

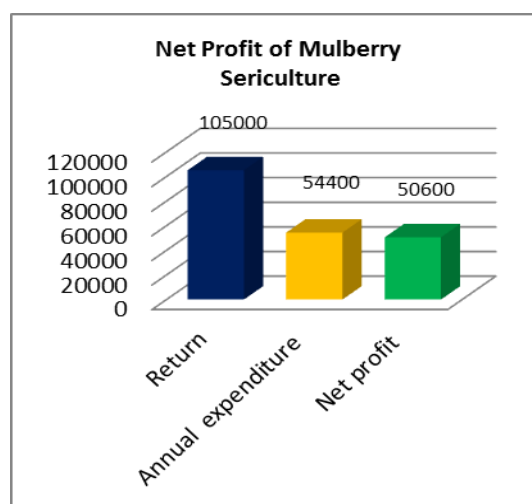
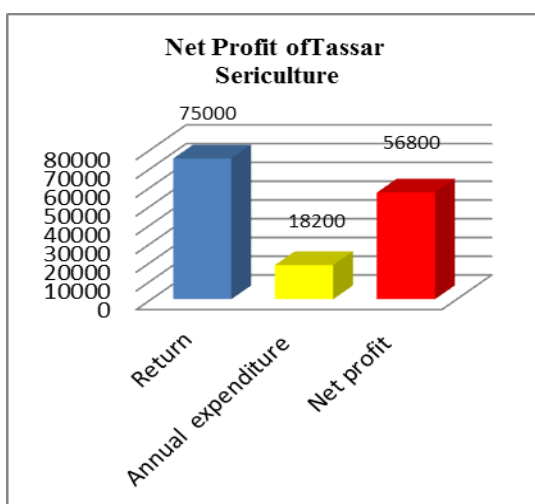


Fig.6. Net Profit of Tassar Sericulture. Fig.7. Net Profit of Mulberry Sericulture.

CONCLUSION

Sericulture is the art and Science that cultivation and production of silk by rearing of silkworm species.

In Chhattisgarh tasar and mulberry are reared on commercial production of silk. Present study confirm that net profit of Tassar silk is more than that of Malberry silk.

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