

Impact of Chawki Rearing on Cocoon Yield, Price and Total Returns at Farmer Level

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Abstract

Chawki rearing is a vital aspect of the sericulture industry. Though the concept of chawki is well understood in India, its contribution is hardly 10 per cent of the total rearing. This paper studies the impact of chawki rearing on cocoon yield, price and returns at the farmers' level in Chitradurga district of Karnataka. The results reveal that average cocoon yield/100 Dfls increased in the chawki reared batch; cocoons harvested from chawki reared batch fetched higher price when compared to silkworm eggs directly distributed to farmers; and farmers' average net gain was higher in the chawki reared batch.

Introduction

Silkworm larval stage from brushing to spinning is of about 26 days duration, clearly differentiated into five instars by four moults. In this, the first two instars i.e till the end of II moult form young age or chawki and remaining three instars form the late age. Chawki rearing is a vital aspect of the sericulture industry. In developed countries like Japan, China and Korea, chawki larvae are supplied to the farmers, where as in India, silkworm eggs are supplied directly to the farmers in majority. In Japan, about 95 per cent of the worms are distributed only after chawki rearing in the Chawki Rearing Centre (CRC). On the contrary in India, though the concept of chawki is well understood, its contribution is hardly 10 per cent of the total rearing. The advantages of exclusive CRC are 1) Stabilizing of cocoon crop and increase in yield. 2) Improvement in quality of cocoon. 3) Control over disease spread. 4) Reduction in rearing expenditure. 5) Distribution of labour for other works (Dandin *et al.*, 2002).

In view of the above advantages, an attempt was made to introduce CRCs in India during 1980s, which however failed miserably due to reasons viz;

a) Expected yield improvement could not be achieved, b) Loss of confidence on the CRCs established purely for profit, c) Lack of guidance and technical support in the establishment of these centers, and d) Non-availability of quality mulberry leaf in bulk and on a continuous basis to sustain chawki rearing on a commercial scale.

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Many such centers disappeared in due course and others were reduced to being just agents to supply eggs and hatcheries (Benchamin *et al.*, 2004). Recently, the technique of mulberry cultivation for chawki and adult rearing has been improved, especially under Japan International Co-operation Agency (JICA) assisted programme in southern sericultural states. The successful demonstration of the new model of CRC in selected places under the programme encouraged many entrepreneurs to take up this activity on a professional scale (Benchamin *et al.*, 2004 & Himantharaj *et al.*, 2007). A similar model of CRC was established at Research Extension Centre (REC), Chitradurga district, Karnataka state with the following objectives :

1. To study the impact of chawki rearing on cocoon yield, cocoon quality and total returns
2. To assess the comparative economics of chawki reared batch versus silkworm eggs distributed directly to farmers

Materials and Methods

Chawki rearing was conducted as per the standard procedure recommended by Kawakami, 2001. Chawki worms were distributed to farmers when worms were settling for II moult. Prior to supply of chawki worms to farmers, silkworm larvae were tested for uniformity of growth, disease freeness, density of worms in the rearing trays, no. of larvae/ 100 Disease free layings (Dfls) as per the chawki certification system recommended by Himantharaj *et al.*, 2008. After dusting lime powder over the rearing bed, the larvae were transferred into the carton boxes @ 20 dfls larvae / box and transported to farmer's rearing house during cooler hours of the day. In order to conduct this study, 72 and 116 farmers were identified for distribution of chawki worms and 100 and 92 farmers were selected for direct supply of silkworm eggs during 2009-10 and 2010-11 respectively. The details with regard to number of farmers, number of silkworm eggs supplied are given in Table 1. During the silkworm rearing period 1-2 visits were made to provide technical guidance to both categories of farmers. Crop harvest details were collected under each category for a period of two years (2009-10 and 2010-11).

Table 1. Sample Size and Number of dfls Chawki reared and supplied and Number of Silkworm Eggs supplied directly to Farmers

Year	Chawki		Direct	
	No. of farmers	No. of Dfls	No. of farmers	No. of Dfls
2009-10	72	20,150	100	22,000
2010-11	116	26,150	92	20,250
Total	188	46,300	192	42,250

Results and Discussion

The data on cocoon yield/100 Dfls revealed that yield was 61.53 kg and 63.90 kg in chawki reared batches, against 58.25 kg and 58.66 kg in direct silkworm egg distributed batches during the year 2009-2010 and 2010-11 respectively (Fig.1). Similarly, cocoon price/kg also improved marginally in chawki reared batches (Rs. 224.50 in 2009-10 and Rs. 328.40 in 2010-11) when compared to direct silkworm egg distributed batches (Rs. 215.70 in 2009-10 and Rs. 319.50 in 2010-11) (Fig.2). The improvement in cocoon yield/100 dfls in chawki reared batches was due to maintenance of optimum temperature, humidity, feeding nutritious tender leaves and maintenance of absolute hygienic condition. The quality of cocoon produced from chawki reared batches improved, and in turn fetched higher price in the cocoon market.

Further, the total returns/100 Dfls also increased in chawki worm supplied batches (Rs.13,814.50 in 2009-10 and Rs. 20,981.60 in 2010-11) when compared to direct silkworm egg supplied batch (Rs.12,564.00 in 2009-10 & Rs. 18,743.60 in 2010-11) (Fig.3). The improvement in total returns/100dfls was due to increase in cocoon yield/100dfls and cocoon price/kg because of chawki rearing.

Economics. The data for the year 2009-10 and 2010-11 clearly indicates that, farmers obtained additional returns of Rs. 774.50/100 Dfls in 2009-10 and Rs. 1763.40/100 Dfls in 2010-11 for incurring extra expenditure of Rs.475/- to get 100 dfls chawki reared worms, when compared to farmers who obtained silkworm eggs directly as may be seen in Table 2.

Conclusion

From the above data, the following conclusions can be drawn

- Average cocoon yield/100 Dfls increased from 58.45 kg (silkworm eggs distributed directly to farmers) to 62.72 kg in chawki reared batch
- The cocoons harvested from chawki reared batch fetched higher price of Rs. 8-9/kg when compared to silkworm eggs directly distributed to farmers

Fig 1: Impact of chawki rearing on cocoon yield /100dfls(Kg)

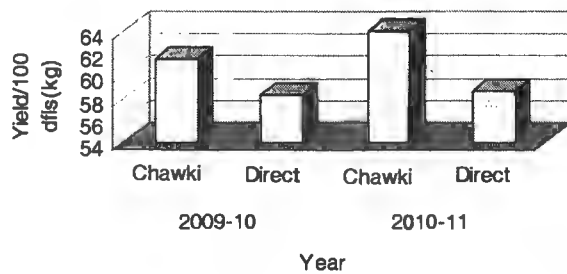


Fig 2: Impact of chawki rearing on cocoon price (Rs.)

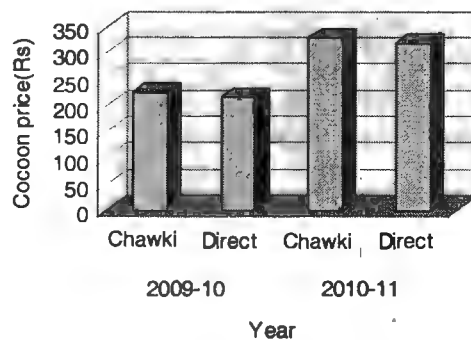


Fig 3: Impact of chawki rearing on return / 100 dfls (Rs.)

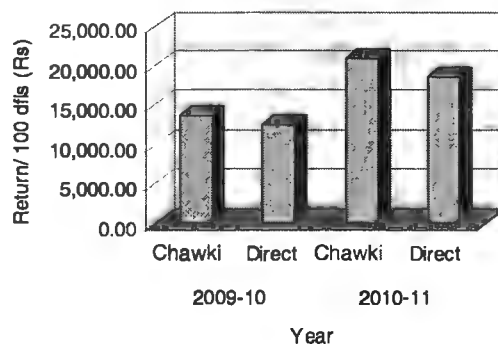


Table 2: Economics of chawki reared v/s direct distribution of silkworm eggs

Year	Chawki worms					Direct distribution of silkworm eggs			
	Cocoon yield/100 dfls (Kg)	Cocoon Rate/Kg (Rs)	Total returns/100 dfls (Rs)	Expenditure for 100 dfls chawki worms *	Net return for 100 dfls (Rs)	Cocoon yield/100 dfls (Kg)	Cocoon rate/Kg (Rs)	Total returns/100 dfls (Rs)	Net gain for 100 dfls (Rs)
2009-10	61.53	224.50	13,814.50	475.00	13,338.50	58.25	215.70	12,564.00	774.50
2010-11	63.90	328.40	20,981.60	475.00	20,507.00	58.66	319.50	18,743.60	1763.40
Total/ Avg.	62.72	276.45	17,398.05	475.00	16,922.75	58.45	267.60	15,653.80	1268.95

* Details of expenditure for 100 dfls chawki worms:

1.	Chawki charges (Rs.)	: 300.00
2.	Chawki boxes for transportation (5 boxes @ Rs. 15/- per box) (Rs.)	: 75.00
3.	Transportation of chawki worms (Rs)	: 100.00
	Total (Rs)	: 475.00

- Farmers average net gain was Rs.1268.95/100 Dfls in chawki reared batch when compared to direct distribution of silkworm eggs
- In addition, farmers got seven days free time to attend to other works and also bring stability in cocoon crops at farmer's level.

Implications

In Chitradurga district, sericultural practices of farmers are broadly traditional. Majority of the farmers do not have proper infrastructure for chawki silkworm rearing and hence use the dwelling house for chawki rearing. This does not provide opportunity to the farmers to take up proper disinfection and chawki rearing themselves. The successful demonstration of chawki rearing promoted a few entrepreneurs to take up CRC on a commercial scale. Further, farmers taking chawki worms from CRC had better cocoon yield, minimized crop loss and thereby assured crop stability. In addition, farmers got free time to attend to other agricultural activities.

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