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Research Article

BIVOLTINE HYBRID BREED – AN ANALYSIS OF PRODUCTION OF COCOON IN KANDI AREA OF PATHANKOT PUNJAB

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ABSTRACT
India is the second largest silk producer but with nominal fluctuation since many years. The need of the time is to increase its product. The earlier increased in production was possible due to change in cultivation and production technology. Though, we are growing in silk production, still major part of our production is from cross breed of inferior quality and productivity compared to bivoltine hybrid which is better. Bivoltine silk production is till reaping to its speed inspite of our massive efforts. In the 20th Century last decade was a time patch when some distinguished scientists of Central silk Board introduced new productive bivoltine hybrids namely CSR2 x CSR4 and CSR19. Government itself had taken so many steps to make this as the most popular hybrids in to improve the silk quality in the country. However, the sustainability and stability of the bivoltine hybrids with a large number of farmers depend on their economic viability over traditional improved cross breed. In this context, a study was taken up to evaluate the economic viability of bivoltine hybrids (CSR2 x CSR4) over cross breed (PM x CSR2) in Pathankot district of Punjab. The study indicated that though the expenditures incurred for rearing CSR hybrids were higher than that of CB rearing due to usage of rearing CSR hybrids, the benefit cost ratio of CSR hybrids was better.

Keywords: *Adoption, Socio-Economic Factors, New Sericulture Technologies, Bivoltine Hybrid and CSR Hybrid*

INTRODUCTION
Silkworm breeds *Bombyx mori* has its own great importance to increase silk production in any tropical silk producing country like India. So many steps had been taken for breeding bivoltine silkworm and a number of improved breeds were developed which were successfully introduced in the field during favorable rearing seasons. The regular efforts for the improvement of cocoon characters of domesticated silkworm were aimed at increased quality silk production (Jayaswal *et al.*, 2001). The main objective of silkworm rearing is to produce qualitatively and quantitatively superior cocoons, which in turn directly depend upon the raw silk production. In spite of its small volume in global textile production, silk has importance in developing economies because of its favorable socio economic consequences (Jayaswal *et al.*, 2001).

Recent Indian sericultural technologies revolutionized the Indian sericulture, shifting from cross-breed to bivoltine hybrid sericulture; for higher production of silk. Besides being the largest importer of quality silk, India is the second producer of raw silk in the world with an annual silk production, However, most of the silk production is from cross between multivoltine and bivoltine silkworm races, which is more suitable for handloom sector and not preferred by the power loom sector and the silk export houses (Krishnan, 2001).

Hence, the power loom weavers and mill sectors prefer imported silk as they consider it to be more uniform, few winding breaks and low losses in imported silk compared to domestic silk productivity of Indian silk. Indian Silk is less useful as compared to that of silk produce in other major silk producing countries such as China, Brazil and Japan (Jayaswal *et al.*, 2001). With the advent of sophisticated power looms and relaxation policies large quantities of high quality silk is being imported at prices lower to local silk. Bivoltine silk excels in quality and productivity is mostly produce in countries having temperate climate. As sufficient quantity and quality silk is not produced in India, India imported a large quantity of bivoltine silk and has emerged as the largest importer of raw silk (Jayaswal *et al.*, 2001).

Now both Central and State Governments provide thrust in India to popularize and promote bivoltine sericulture in the country with an objective of increasing the quality and productivity of Indian silk. However, the sustainability and stability of the bivoltine hybrids with a large number of farmers depend on their economic viability of over traditional improved breeds. Bivoltine Hybrid Technology is a HYV technology in Indian sericulture (Hiriyanna *et al.,* 2002). In this contact, a study was taken up to evaluate the economic viability of bivoltine hybrids (CSR2 x CSRS4) over cross breed (PM x CSR2).

MATERIALS AND METHODS

The studies was conducted in Research Centre, Sujanpur in Pathankot district of Punjab, as it is one of the large producer of bivoltine cocoons in Punjab. For this study, seven villages were selected where sericulture was villager's profession. Among the selected sericultural villages, the name of CSR hybrid rearers and cross breed cocoon producers were obtained from CSCR Center of Department of Sericulture, Sujanpur (Kumaresan *et al.,* 2002). In the Pathankot District, 7 villages were selected at random and in each village, 5-6 cross breed rearers and 5-6 CSR hybrid rearers were selected at random for the collection of data. Thus, 38 CSR hybrid and 37 cross breed rearers were selected for data collection and 38 cross breed and 37 CSR hybrid rearer farmers were selected as the sample in Pathankot district (Reddy *et al.,* 2002; Suresh Kumar *et al.,* 2003). Total sample size constituted 75 CSR hybrid and 75 cross breed rearers from different sites of different seven villages for sample study for its two distinct activities i.e.

(a) Leaf production
(b) Silkworm rearing for cocoon production. The experiment was conducted for the cost production of mulberry leaf and silkworm rearing to produce cocoons (Suresh Kumar *et al.,* 2003). Conducted experiment also consider following factors like

(a) The size of mulberry land holdings,
(b) The method of mulberry cultivation.

RESULTS AND DISCUSSION

The results indicate that the total cost of leaf production from operational and fixed cost was more per acre per year for the CSR hybrid than for cross breed represented in Table 1. The operational cost for Bullock power, farmyard manure was more of CSR hybrid than Cost of Cross breed. Same sanario was follow by fertilizers, labour, irrigation and other cost. The expenditures incurred by cross breed rearers on other cost was less for Cross breed than CSR Hybrid (Suresh Kumar *et al.,* 2003).

Table 1: Cost of Mulberry Leaf Production of CSR Hybrid and Cross Breed (Rs./Acre/Year)

Sr. No.	Items	CSR Hybrid		Cross Breed	
		Cost	%	Cost	%
A	Operational Costs				
1	Bullock power	805.73	7.13	796.17	8.06
2	Farmyard manure	2665.33	23.60	2349.22	23.78
3	Fertilizers	1842.20	16.31	1778.92	18.01
4	Labour	4385.73	38.83	3487.78	35.30
5	Irrigation	583.20	5.16	622.66	6.30
6	Other costs	156.22	1.38	82.70	0.84
7	Interest on working capital	237.86	2.08	205.14	2.08
	Total variable cost	10673.28	94.49	9322.60	94.36
B.	Fixed costs	622.28	5.51	557.28	5.64
	Total leaf production cost	11295.56	100.00	9879.87	100.00

Interest on working capital and other costs accounted for 2.08 % and 0.84 % of the total cost, respectively in case of cross breed rearers. The total variable costs of mulberry leaf production worked out to Rs.

10,673.28 and Rs 9,322.59 respectively for CSR hybrid and cross breed cocoon production only (Suresh Kumar, 2005).

Mulberry is being a perennial crop, the costs incurred on establishment of mulberry garden was the economic life span of mulberry garden, and accounted as fixed costs in working out the cost of mulberry. The fixed cost incurred by the CSR hybrid rearers was more than Cross breed of the total cost.

The details of the expenditures incurred in different items of CSR hybrid and cross breed rearing and the total revenue generated thereby are presented in Table 2. Average number of eggs reared per acre per year in CSR hybrid was less 18 boxes compared to that of cross breed 21 boxes, as it indicates the CSR hybrids consume more mulberry leaf compared to cross breed (Seidavi *et al.*, 2008). The total cost of cocoon production was worked out to be more for CSR hybrid, than of variable costs of Cross breed. Cost of Disinfectants, Materials, Labour, Hiring charges of mountages was less for CSR hybrid than Cross breed. For Transportation and marketing sanario was reverse for Cross breed and CSR hybrid. The cost incurred for the cross breed cocoon production for one acre per year estimated as Rs. 37777.61 in which the variable costs formed the major portion with Rs. 32208.59 (Seshagiri *et al.*, 2009).

Table 2: Costs and Returns in Silkworm Rearing of CSR Hybrid and Cross Breed (Rs./Acre/Year)

Sr. No.	Items	CSR Hybrid		Cross Breed	
		Cost	%	Cost	%
	Average number of dfls reared	909.08		1054.34	
A	Variable Cost				
1	Leaf	11295.56	29.47	9879.87	26.15
2	Dfls	2397.70	6.25	3057.58	8.09
3	Disinfectants	1982.59	5.17	1886.56	4.99
4	Materials	277.59	0.72	316.90	0.84
5	Labour	12792.70	33.37	13237.25	35.04
6	Hiring charges of mountages	1793.47	4.68	1751.38	4.64
7	Transportation and marketing	1535.20	4.00	1598.63	4.23
8	Interest on working capital	481.12	1.26	480.42	1.27
	Total variable costs	32555.58	84.93	32208.59	85.26
B.	Fixed costs				
	Depreciation on building and equipments	5777.33	15.07	5569.02	14.74
	Total Cost	38332.91	100.00	37777.61	100.0
C.	Revenge Average cocoon yield (Kg/100 dfls)	61.70		119.59	
	Average cocoon price (Rs./Kg)	138.16		55.98	
	Cocoon production (Kg/acre/year)	560.90		590.22	
	Total Income from cocoon	77494.27		70584.35	
	Income from by-products	945.20		1003.69	
	Total revenue	78439.47		71588.04	
	Net return	40106.56		33810.43	
D.	B :C ratio	2.05		1.89	

Revenge Average cocoon yield was more in CSR breed. Average cocoon price was more in Cross breed. Cocoon production was slightly higher in case of CSR. Total Income from cocoon and Income from by-products incurred in CSR.

Revenue, which includes the revenue from sale of cocoon and value of by-products generated, worked out to be more for CSR hybrids than cross breed. The gross revenue and total cost, was found more for CSR hybrids than that of cross breed (Ramesha *et al.*, 2009). The B: C ration was worked out to 2.05 for CSR hybrid and 1.89 for cross breed.

To conclude, though the cost of production of CSR hybrids was higher than of cross breed, the CSR farmers obtained better yield and realized better price compared to cross breed farmers. Hence, the benefit-cost ratio of CSR hybrids was better than cross breed (Seidavi, 2010). As rearing of CSR hybrids is more profitable than cross breed, systematic efforts may be taken up to popularize CSR hybrids in the field for improving the production of quality silk to meet the domestic demand and thereby reducing the import of silk especially from China. The advantage of increased profitability of CSR hybrids can be shown to the farmer through result demonstrations in different areas (Seidavi, 2010). It is learnt in the bivoltine popularization programmers that CSR hybrid rearing requires more inputs in case of disinfectants, farmyard manure and fertilizers and facilities such as separate rearing house, shoot rearing and new type of card board mountages compared to cross breed rearing. At the time of survey, it was found that the laying and disinfectants were supplied free of cost to the farmers by the State Government for CSR hybrid rearing (Beula Priyadarshini *et al.*, 2013). It is suggested that such financial and technical assistance should be continued for a defined period for further popularization and sustenance of bivoltine sericulture with the farmers. This would ultimately result in meeting the domestic demand of quality silk.

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