Original Research Article

IMPACT OF ADOPTION OF MULBERRY AND SILKWORM PRACTICE ON YIELD AND INCOME OF BIVOLTINE HYBRID SILKWORM REARING SERICULTURISTS OF SOUTH EASTERN DRY ZONE OF KARNATAKA

ABSTRACT

The study was conducted in Kolar and Chikkaballapur districts of Karnataka state, toanalyze the impact of adoption of bivoltine and multi × bivoltinehybrid silkworm rearing practices on cocoon yield and income of silkworm rearers.A sample of sixty bivoltine and multi × bivoltinehybrid silkworm rearing farmers were randomly selected from both the districts. The data was collected using a pre-tested interview schedule and the data was analyzed using suitable statistical tools. The results revealed that, more than two-fifth of the bivoltine hybrid silkworm rearers belonged to high (43.33%) adoption category whereas, more number of multi × bivoltinehybridsilkworm rearing 40.00 per cent of the rearers belonged to low adoption category with regard recommended mulberry cultivation practices. More than half of the bivoltine hybrid silkworm rearers belonged to high adoption category (53.33%) as compared to the multi × bivoltinehybridsilkworm rearing, greater proportion of the rearers belonged to low adoption (40.00 %) category with regard to improved silkworm rearing practices. The mulberry leaf yield (23.50 tonnes/acre/ year) and cocoon yield (1494 kg/acre/year) of the bivoltine hybrid silkworm rearers were significantly found high with an average net income of Rs 3,20,397.00 per acre per year as compared to the mulberry leaf yield (20.50 tonnes/acre/year) and cocoon yield (1049 kg/acre/year) of multi × bivoltine hybrid silkworm rearers who are getting an average net income of Rs. 2,23,663.00 per acre per year.

Key words : Adoption, Bivoltine, Sericulture, Sericulturist, Silkworm

1. INTRODUCTION

Sericulture is a labour-intensive farm-based activity that falls under the cottage and small-scale sector. It has undisputedly reigned as the "Queen of textiles" over the centuries. According to historical evidence, silk was discovered in China, and the industry spread from

there to the rest of the world. Despite having a negligible share of the global textile market (less than 0.2%), silk production is spread across sixty countries. While Asia is the primary producer (90.00% of mulberry silk and more than 100% of non-mulberry silk) (Anonymous, 2021). Sericulture has proven to be an appropriate vocation in India for inclusive development of the rural population, particularly the poorer sectors of society, addressing equity distribution from urban privileged to rural poor.

The total silk production in the country during 2023-24 was 38,913 MT which is 6.37% higher than the production achieved during previous year (36,582MT) and around 88.4% of the annual targeted production for the year 2023-24(Anonymous, 2024). The bivoltine raw silk production increased substantially by 42.60% from 6,783 MT during 2020-21 to 9,675 MT during 2023-24. This will not only check the import of raw silk but also safeguard the interest of the primary producers of the country (Anonymous, 2020). In Karnataka, the major cocoon production is coming from the south-eastern dry zone, the districts like Kolar and Chikkaballapur accounted for the second and third largest areas under mulberry respectively, under both rain fed and irrigation, conditions (Anonymous, 2019). In order to understand the performance of the technologies and assist policy makers and extension workers in identifying the areas that require special attention, a study on the adoption level of bivoltine and multi-bivoltine hybrid silkworm rearing technologies at the field level is highly important.

2. MATERIALS AND METHOD

The present study was conducted in traditional sericultural belt of south-eastern dry zone of Karnataka *i.e.,* Kolar and Chikkaballapur districts. Fifteen villages from Chikkaballapur (7 No.) and Kolar (8 No.) districts were randomly selected for the study. Thirty silkworm rearers practicing bivoltine hybrid silkworm rearing from both Chikkaballapur and Kolar districts were randomly selected for the study. Data was collected by using a detailed interview schedule employing personal interview method. Statistical tools like percentage, mean and standard deviation were used to analyze the data.

3. RESULTS AND DISCUSSION

3.1 Overall adoption of recommended mulberry cultivation practices by bivoltine hybrid and multi × bivoltine hybrid silkworm rearers

More than two-fifth of the bivoltine hybrid silkworm rearers belonged to high (43.33%) adoption category followed by medium (40.00%) and low (16.67%) level of adoption categories with regard recommended mulberry cultivation practices. Whereas, in case of multi × bivoltinehybridsilkworm rearing 40.00 per cent of the rearers belonged to low adoption category followed by equal percentage of medium (30.00%) and high (30.00%) level of adoption categories (Table 1). The results are in line with the findings of Dolli *et al.* (1993) and Rao and Choudhry (2001). The findings are also in conformity with Imrankhan (2019) who reported that, majority of the bivoltine hybrid silkworm rearers had fully adopted recommended mulberry cultivation practices in Chitradurga district.

Further involvement in various training programmes offered by extension departments in study regions resulted in the dissemination of technologies that improved silkworm rearer expertise and led to high adoption among bivoltine hybrid silkworm rearers. One of the reasons for high adoption could be that the majority of respondents are better educated. There was a significant difference between the adoption of recommended mulberry cultivation mean scores of both bivoltine hybrid and multi × bivoltinehybridsilkworm rearers at one per cent (9.59). These results are supported by Gopala (1991) who reported the significant difference in the overall knowledge and adoption between developed and less developed areas of Kolar district. More or less similar kind of findings was reported by Vijaya Prakash and Dandin (2005) wherein,the adoption rate of improved sericultural technologies was better with the bivoltine farmers compared to multi × bivoltine hybrid silkworm rearers. Also the profile characters of farmers are found important in deciding about the adoption of bivoltine silkworm rearing.

Table 1: Overall adoption of recommended mulberry cultivation practices by bivoltine hybrid and multi × bivoltine hybrid silkworm rearers

Sl. No.	Particulars	Silkworm rearers			
		Bivoltine hybrid (n□=30)		Multi × bivoltine hybrid (n□=30)	
		Frequency	Percentage	Frequency	Percentage
1	Low	5	16.67	12	40.00
2	Medium	12	40.00	9	30.00
3	High	13	43.33	9	30.00
Mean score		**15.53**		**12.11**	
Standard deviation		**1.87**		**3.93**	
't' values		**9.59****			

****Significant at 1%**

3.2 Overall adoption of improved silkworm rearing practices by bivoltine and multi × bivoltinehybrid silkworm rearers

More than half of the bivoltine hybrid silkworm rearers belonged to high adoption category (53.33%) followed by medium (26.67%) and low (20.00 %) adoption categories. Whereas in case of multi × bivoltinehybridsilkworm rearing forty per cent of the rearers belonged to low adoption category followed by medium (36.67%) and high (23.33%) adoption categories, respectively (Table 2).

There was a highly significant difference in mean adoption scores between bivoltine and multi × bivoltine hybrid silkworm rearers in terms of improved silkworm rearing methods. Student 't' test revealed that, significant difference at one per cent level (34.95) was noticed between mean score in adoption of improved silkworm rearing practices by bivoltine hybrid and multi × bivoltinehybridsilkworm rearers (Table 2). Similar findings are also reported by Vijaya Prakash and Dandin (2005) where they reported that, the adoption rate of silkworm rearing technologies better with the bivoltine farmers compared to multi × bivoltinehybridrearers. Similar observations are also noticed by Lakshmanan and Geethadevi (2007).

Sreenivas *et al.* (2009) stated that price is a major determinant of cocoon production *vis-a-vis* the adoption of technologies. All efforts to stabilize the level of cocoon price at the market level can be an influencing factor for the rate of adoption. Further, other factors such as experience

and frequent participation in different extension activities helped in grasping the technologies through constant extension contact and mass media.

Table 2:Overall adoption of improved silkworm rearing practices by bivoltine and multi × bivoltinehybrid silkworm rearers

Sl. No.	Particulars	Bivoltine hybrid (n□=30)		Multi × bivoltine hybrid(n□=30)	
		Frequency	Percentage	Frequency	Percentage
1	Low	6	20.00	12	40.00
2	Medium	8	26.67	11	36.67
3	High	16	53.33	7	23.33
Mean score		**58.03**		**45.20**	
Standard deviation		**6.82**		**4.22**	
't' values		**34.95****			

****Significant at 1%**

3.3 Impact of adoption of recommended mulberry cultivation and improved silkworm rearing practices on cocoon yield and income of silkworm rearers

3.3.1 Yield

3.3.1.1 Mulberry yield (tonnes/acre/year)

There was a significant difference in the mulberry leaf yield between bivoltine and multi × bivoltinehybrid silkworm rearers. The average mulberry leaf yield raised by the bivoltine hybrid silkworm rearers was 23.50 tonnes per acre per year and multi × bivoltinehybrid silkworm rearers was 20.50 tonnes per acre per year (Table 3).

This might be due to the fact that majority of bivoltine hybrid silkworm rearers fall under high adoption level category who adopted recommended mulberry cultivation practices whereas, majority of multi × bivoltinehybridsilkworm rearers fall under low adoption category.

High adoption of recommended mulberry cultivation may be the reason for high yield among bivoltine hybrid silkworm rearers as compared to multi × bivoltinehybridsilkworm rearers. Similarly, Choudary *et al.* (2017) reported that, farmers adopted the recommended package of practices completely could harvest the highest mulberry yield whereas partial adopters and nil adopters harvested less mulberry leaf yield.

3.3.1.2 Cocoon yield (kg/ acre / year)

There is a significant difference in cocoon yield between both bivoltine hybrids and multi × bivoltinehybridsilkworm rearers. The average cocoon yield was 1494 kg per acre per year in case of bivoltine hybrid silkworm rearers. Whereas in case of multi × bivoltinehybridsilkworm rearers it was 1049 kg per acre per year (Table 3). The reason for bivoltine hybrid silkworm rearers getting good cocoon yield might be due to the knowledge and the adoption level regarding improved silkworm rearing practices led to increase in cocoon yield compared to multi × bivoltinehybrid silkworm rearers. Similar findings are also reported by Quadri *et al*. (2002) and Hiriyanna *et al*. (2005)

3.3.2 Income (Rs/acre/year)

3.3.2.1 Cost of production

There is a significant difference in the average cost of production (raising of mulberry crop and rearing of silkworm) between bivoltine and multi × bivoltinehybridsilkworm rearers.The average cost of production in case of bivoltine hybrid silkworm rearers is Rs 3,30,667.00 per acre per year, whereas in case of multi × bivoltinehybridsilkworm rearers it was Rs 1,03,946 per acre per year (Table 3). The reason for high cost of production of bivoltine hybrid silkworm race was due to utilization of high inputs to get good yield[Shwetha and Shivalingaih (2018) ; Imrankhan *et al*. (2019)].

3.3.2.2 Gross income

There is a significant difference in the gross income between bivoltine hybrid and multi × bivoltinehybrid silkworm rearers. The average gross income of bivoltine silkworm rearing was Rs. 6,79,824.00 per acre per year, whereas in case of multi × bivoltinehybrid silkworm rearing the average gross income was Rs. 3,48,477.00 per acre per year (Table 3). Similar kind observations was made by Shwetha and Shivalingaih (2018) and Imrankhan *et al*. (2019).

3.3.2.3 Net income

There is also a significant difference in the net income between bivoltine hybrid and multi × bivoltinehybrid silkworm rearers. The average net income of bivoltine hybrid silkworm rearing was Rs. 3,20,397.00 per acre per year. Whereas in the case of multi × bivoltinehybrid

silkworm rearing the average net income was Rs. 2,23,663.00 per acre per year, respectively (Table 3).

The yield and income of bivoltine hybrid silkworm rearers are high as compared to multi × bivoltinehybrid silkworm rearers. This is because of correct adoption of package of practices, frequent extension participation and the education level of an individual is directly related to performance of the individual. People are ready to change and more innovative would certainly adopt more number of improved sericultural practices. The results are in line with the findings of Lakshmanan *et al.* (2000) who reported that, rearing of bivoltine silkworm rearers had earned higher net return than crossbreed rearers owing to the prevailing suitable climate, skilled man power and technical guidance received from developmental agencies.

Similar observations also made by Qadri *et al.* (2002) reported that cluster promotion programme also helps the bivoltine hybrid silkworm rearers in increasing the yield. Also Hiriyanna *et al*. (2005) and Lakshmananand Geethadevi (2005) reported that, the net profit earned from bivoltine cocoonproductionwasmuchhigherthanmulti × bivoltine hybrid silkworm rearing. Similarly Lakshmanan and Geethadevi (2005) reported that, bivoltine hybrid rearers earned higher net return than multi × bivoltinehybrid silkwormraces owing to the prevailing suitable climate, skilled man power and technical guidance received from developmental agencies.

Table 3: Impact of adoption of bivoltine and multi × bivoltinehybrid silkworm rearing on cocoon yield and income of silkworm rearers

Sl. No.	Particulars	Silkworm rearers		t - value
		Bivoltine hybrid (n□=30)	Multi × bivoltine hybrid(n□=30)	
A	**Yield**			
1	Mulberry leaf (Tones/acre/year)	23.50	20.50	**3.13****
2	Cocoon (Kg/acre/year)	1494.00	1049.00	**3.10****
B	**Income**			
1	Cost of production (Rs/acre/year)	330667.00	103946.00	**8.38****
2	Gross income (Rs/acre/year)	679824.00	348477.00	**5.85****
3	Net income (Rs/acre/year)	320397.00	223663.00	**3.05****

****Significant at 1%**

4. CONCLUSION

The study found that when compared to multi×bivoltine hybrid silkworm rearers, most of the bivoltine hybrid silkworm rearers used the majority of the recommended mulberry cultivation technologies and improved silkworm rearing practices, so the yield and income of the bivoltine hybrid silkworm rearers were stabilized, as were the socio-economic conditions. The yield and income of the bivoltine hybrid silkworm rearers differed significantly. The main reason for low yield and income in the case of multi × bivoltine hybrid silkworm rearers was a lack of knowledge and low adoption level on bivoltine hybrid silkworm rearing practices. To increase the income of silkworm rearers, more training programmes and field demonstrations on recommended mulberry cultivation technologies and silkworm rearing practices should be conducted.

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