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RESEARCH ARTICLE

Studies on the impact of selected sericultural technologies in Bangalore, India

M. SHOBHA RANI, U.D. BONGALE, H.R. RAVEENDRA AND R. KRISHNA MURTHY

See end of the article for authors' affiliations

Correspondence to :
M. SHOBA RANI
Karnataka State Sericulture Research and Development Institute, Thalaghattapura, BANGALORE (KARNATAKA) INDIA

ABSTRACT

The study was conducted in seven villages of Bangalore South district of Karnataka, covering a total of 127 farmers. Benchmark survey was conducted through personal interview by using structured proforma to resource the primary data to understand the existing practices and productivity levels, and for identifying the crucial factors. Further for intensive study, 30 among these 127 farmers were selected based on their willingness to adopt the suggested technologies. Regular interactions were held for two years on one-to-one basis with these farmers along with motivational efforts for technological interventions as were enlisted for respective farmers. Impact survey was carried out and crop performance data computed for 1st and 2nd year, apart from compiling the information pertaining to the performance and suitability of the technologies and response of each of the farmers during the course of the study. The data revealed that cocoon yields increased by 8-13 kg with the adoption of identified technologies among the target farmers.

Key words : New technologies, Adoption, Impact survey

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INTRODUCTION

Sericulture technologies have major impact on raw silk production as evidenced by multifold development of sericulture in traditional and non-traditional areas in Karnataka and elsewhere in India. Development of new technologies and proper dissemination among the farmers lead to higher production (Sudhakar Rao *et al.,* 2002 and Chowdary, 2002).

A number of technologies made available in sericulture by research institutes find varied levels of adoption and acceptance in the field. This varied and low or partial adoption of improved technologies by farmers is one of the reasons for lower cocoon yields giving scope for further improvements. Important among these technologies, application of farmyard manure in required quantity, separate Chawki garden, separate Chawki rearing room, egg incubation, black boxing of eggs and using bed disinfectants in recent years are mainly contributed for increased cocoon yields. Present study was hence conducted to assess the adoption level of improved sericulture technology and its association with cocoon yields and to explore further strategies for better adoption towards improved yields.

METHODOLOGY

For the purpose of initiating the study, seven villages namely, Karubele, Devagere, Thagachuguppe, H.Gollahalli, Gaviayanapalya, K. Gollahalli and Kamblipura covering 3 TSCs (Technical service centres) in Bangalore district of Karnataka were identified as the study area. Benchmark survey was conducted to identify the need based technologies for selected farmers (study farmers) for Bangalore district and crucial technologies responsible for the cocoon production among 127 farmers covering seven villages of the study area. Soil fertility management, maintenance of separate Chawki garden, effective disinfection of rearing house and equipments, incubation and black boxing of eggs, shelf method for late age silkworm rearing and the use of bed disinfectants were identified as crucial technological gaps among the study farmers. Soil samples from all the study farmers' gardens covering the seven villages were collected and analyzed to assess the soil fertility status in the study area. For the intensive study on the adoption of technologies, 30 farmers were selected (target farmers) among 127 farmers based on their willingness to adopt and to practice new technologies. The target farmers were grouped into High (H), Medium (M) and Low cocoon yield groups (with cocoon yields of >50 kg, 40-50 kg and 30-40 kg/100 dfls, respectively), based on the cocoon yields recorded in previous crops. Regular interactions were held with the target farmers apart from periodical group discussions involving the study farmers and the programme of study was spread over for two years enabling collection of data for 10 crops and details from each farmer.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented in Table 1, 2, 3 and 4.

Benchmark survey:

Benchmark survey revealed that the level of adoption of technologies were poor and improper in all the seven villages. Among all the technologies listed, black boxing of eggs (89%) and use of bed disinfectants like Sanjeevini and Suraksha (61%) were adopted by majority of the farmers (Table 1). However, the disinfection of rearing equipments was not as per the recommendations, and many farmers used less quantity of farmyard manure to the mulberry gardens.

Soil fertility status of target farmers:

The data (Table 2) revealed that, the average soil P^H was around neutral (7.2) and suitable for mulberry cultivation, EC was normal and the OC in medium range (in the range of 0.53, 0.66%, respectively). The phosphorus, potassium and micronutrients Fe, Zn, Mn and Cu were in more than the optimum level. Proper evaluation of the fertility status of the mulberry gardens and application of recommended dosage of the fertilizers play key role in the improved productivity in mulberry (Bongale, 1993).

Extent of adoption of technologies by target farmers:

Extent of adoption of the selected technologies among the target farmers (Table 3) during the two years study revealed that egg incubation, black boxing and use of bed disinfectants were adopted by the all the H group farmers (100%). 80% and 70% whom adopted separate Chawki rearing room and effective disinfection, respectively. Among other technologies, application of bio fertilizers, maintenance of separate Chawki garden and shoot feeding were adopted by 50% of the farmers. Similarly, all among the M group of farmers adopted egg incubation, black boxing and use of bed disinfectants (100%), 90% of them adopted separate Chawki rearing room, while separate Chawki garden and recommended dosage of farmyard manure were adopted by 70% of the this group. Poor response was observed towards effective disinfection of rearing house and equipments (40%) and application of biofertilizers and shoot feeding (30%).

Table 1 : Benchmark survey information on study farmers (n=127)

	No. of of farmers *	Percentage
Mulberry garden (acre)		
<1	21	17
1-3	99	78
>3	7	6
Application of manure		
FYM	33	26
FYM+Cmpx	15	12
FYM+Urea	24	19
FYM+Cmpx+AS	8	6
FYM+BF	6	5
Mixed	41	32
Separate Chawki garden		
Yes	42	33
No	85	67
Disinfection		
Fmln	59	47
Fmln+BL pdr	17	13
Lime+Fmln	21	17
Lime+BL	6	5
Others	24	19
Race		
CB	75	59
BV	8	6
CB+BV	44	35
Rearing method		
Shelf	52	41
Tray	75	59
Use of black box		
Yes	114	90
No	13	10
Bed disinfectants		
Vijetha	12	11
Sanjeevini+Suraksha	66	61
Uzi powder	1	01
Mixed	29	27

Note: No. of Villages= 7, No. of farmers =127, FYM=Farm yard manure, Cmpx=Complex, AS= Ammonium sulphate, BL=Bleaching powder, CB=Cross breed, BV=Bivoltine

Even among L group of farmers, all of them adopted egg incubation, black boxing and use of bed disinfectants (100%) while, very poor response was observed towards effective disinfection of rearing house and equipments. Technologies like application of farm yard manure, separate Chawki garden, separate Chawki rearing room and shoot feeding were adopted by 20% of the farmers in this group where in none of them adopted the

Table 2 : Soil fertility status of target farmers' mulberry gardens (n=30)

	Soil parameters									
	pH	EC	OC (%)	N (kg/acre)	P (kg/acre)	K (kg/acre)	Zn (ppm)	Fe (ppm)	Cu (ppm)	Mn (ppm)
Average	7.217	0.530	0.656	1150.400	18.300	94.311	4.929	22.029	19.622	5.386
High	7.107	0.397	0.675	1150.167	19.467	110.333	5.991	27.094	25.008	7.046
Medium	7.408	0.565	0.662	1524.767	15.967	95.333	4.295	29.385	21.592	5.392
Low	7.136	0.627	0.631	776.267	19.467	77.267	4.501	9.610	12.265	3.720
F-test	HS	HS	NS	HS	HS	HS	HS	HS	HS	HS
C.D. (P=0.05)	0.0876	0.0626	---	197.3204	1.0654	8.7296	0.4879	5.7030	3.4778	0.8766
C.D. (P=0.01)	0.1180	0.0844	---	265.7351	1.4348	11.7563	0.6571	7.6804	4.6837	1.1806

Note: HS= Highly significant, NS=Non significant

biofertlizers application.

Application of recommended dosage of farm yard manure was not commonly prevalent among the Low group of farmers due to its timely non-availability and high cost. These results are in agreement with the earlier reports by Chikkanna *et al.* (1995) and Raghu *et al.* (1999) who reported that the adoption level of farm yard manure among different categories of the farmers was in the order of big farmers followed by small and marginal farmers. Ready acceptance of simpler technologies like egg incubation and black boxing among Low group of farmers was due to its low cost and higher simplicity and effectivity which appeared to be the crucial for the success and prevalence of these technologies particularly among the Low group. None of the Low group of farmers adopted biofertlizers application inspite of its cost effctiveness and sustainability (Bongale and Nadiger 1989). Similarly adoption of shoot feeding technology was also not widely prevalent among medium and low groups of farmers due to higher space requirement in rearing, even though its adoption has clear advantages in terms of labour saving, apart from improvements achievable in terms of cocoon yields and crop stability. The concept of using bed disinfectants during late age rearing was more commonly accepted by all the groups of farmers, possibly due to its affordable price and high effectiveness. Farmers generally resist changing to new technologies because of fear of crop failures and/or increased investments costs. The adoption rate with respect to all the technologies by low group of farmers was accordingly less compared to high and medium groups of farmers owing to different constraints that hinder the rate of adoption. A similar observation was also made by Gopala *et al.* (1992) and Munikrishnappa *et al.* (1999) who reported that fluctuation in the cocoon prices, lack of finance and poor knowledge level were the main constraints among small farmers.

Table 3: Extent of adoption of suggested technologies by the different categories of target farmers (% of 10 farmers in each category)

Technologies	H*	M*	L*
Application of farmyard manure	90	70	20
Application of biofertilizers-Prakruthi, Seriphos	50	30	0
Separate Chawki garden	50	70	20
Effective dis-infection of rearing house and equipments-round tank method	70	40	10
Separate Chawki rearing room	80	90	20
Egg incubation	100	100	100
Black boxing	100	100	100
Shoot feeding	50	30	20
Bed disinfectants-Suraksha, Sanjeevini	100	100	100

Note: H* = High group of farmers, M* = Medium group of farmers, L* = Low group of farmers.

Technological interventions and crop performances among the target farmers:

Average cocoon yield of 58 kg/100 dfls was recorded among the H group before adoption of technologies, increased to 64.80 kg and 71.66 kg after first and second year, respectively with the adoption of technologies (Table 4). Corresponding figures were from 49.50 kg, to 50.90 kg and 57.3 kg for the M group and from 33 kg, 40.20 kg and 45.82 kg for the same period for L group of farmers.

An analysis of the data showed that the average increase in cocoon yield was encouraging in all the three groups, the extent of increase which was rather low in M group compared to H and L groups could be attributed to partial adoption of certain crucial technologies. Similarly, Phillip *et al.* (2005) also recorded that difference in the yield improvements among the farmers was mainly due to adoption of technologies in total or in partial. Good rearing conditions and proper adoption of improved technologies are responsible for higher productivity

Table 4 : Cocoon yields after technological interventions among the target farmers

Performing level of farmers	Yield during benchmark survey (kg/100dfls)	I year	II year
High	58.0	64.8	71.66
Medium	49.5	50.9	57.30
Low	33.0	40.2	45.82

(Balasubramaniam, 2000).

Increase in cocoon yields among H group of farmers in the present study could be attributed to good soil fertility management, since majority of the farmers were applying recommended quantity of farm yard manure in two split doses, and also half the number of farmers were using biofertilizers. These are in conformity with the Bongale and Lingaiah, (1998). Bongale and Mallikarjunappa (2004) documented importance of soil organic matter and its relevance in several other studies on mulberry and other crops in Karnataka and elsewhere. Similarly, separate Chawki garden and Chawki rearing room though were adopted by the majority among the medium group of farmers, extent of improvement (in cocoon yields) were comparatively less. Possibly owing to the overlapping of silkworm crops with vegetable cultivation resulting in lesser attention towards silkworm rearing among this group due to practical problems. Another reason could be the prevailing tray method of rearing, shortage of trays in the final stages resulting in overcrowding of larvae, dependence of barrowed trays leading to usage of uncleaned trays which causes secondary contamination. Such management limitations are found to be prevailing more commonly among the M group of sericulturists which is also related to over ambitious attitude.

Conclusion:

Adoption of improved technologies among the Medium cocoon yielding farmers was not encouraging as only 8 kg of cocoon production improved. Improved practices are very essential to improve the quality and quantity of the end product. In order to enhance the productivity and profitability, there a need to address the farmers' constraints adopting the need based approaches and situation based solutions. Yield improvements owing to the adoption of identified technologies were rather low among the medium group of farmers, their crops are more optimized and stabilized within the given situations, and hence may need to adopt a greater make-over and shift in the systems approach and resultant management of resources.

Authors' affiliations

U.D. BONGALE, Karnataka State Sericulture Research and Development Institute, Thalaghattapura, BANGALORE (KARNATAKA) INDIA

H.R. RAVEENDRA AND R. KRISHNA MURTHY, Department of Agricultural Chemistry and Soil Science, College of Forestry, UAS (B), PONNAMPET (KARNATAKA) INDIA

REFERENCES

Balasubramaniam, V. (2000). Sericulture industry in India-past, present and future, Souvenir, Natl.Conf.on strtagies for sericulture and research development. CSB, 1-4.

Bongale, U.D.(1993). Fertility evaluation and fertilizers recommendations for mulberry garden soils. *Indian Silk,* **31**(9):5-8.

Bongale, U.D. and Nadiger, G.S. (1989). The role of biofertilizers in mulberry cultivation. *Indian Silk*, 28(1):34-37.

Bongale, U.D. and Lingaiah (1998). Soil fertility status and correlations among fertility parameters in mulberry garden soils. *Indian J.Seric.*, **37**(1):81-84.

Bongale, U.D.and Mallikarjunappa, R.S. (2004). Soil health care management in mulberry cultivation (ICTP). *KSSRDI Technical Publication,* No.57:18.

Chikkanna, Anjaneya Gowda, D.M., Singhavi, N.R. Srinivasa, G. Iyengar, M.N.S. and Datta, R.K. (1995). Study on adoption behaviour of sericulturists and their characteristics in Kolar district of Karnatak. *Indian J.Seric*., 34 (1):10-14.

Chowdary, N.B. (2002). Impact on adoption of new technologies in Palmaner of Andhra Pradesh. *Indian Silk*, **40**(10): 15-17

Gopala, M. Krishna, K.S. and P.Gokulraj, M. (1992). A study on adoption of recommended silkworm rearing practices by farmers. *Indian Silk,* **31**(2):25-26

Munikrishnappa, H.M. Jagadisha and Srinivasa, G. (1999). A study on knowledge and adoption of improved rearing practices by sericulturists in Mysore district. Proc. of National Seminar on tropical sericulture 1999, Dec.1999, UAS, Bangalore. Eds. Chinnaswamy, K.P., Govindan, R., Krishnaprasad, N.K. and Reddy, D.N.R: pp. 16-17.

Philip, A.V., Mary Joseph, Soudaminy and Qadri, S.M.H. (2005). Effect of sericulture technology package on mulberry leaf and cocoon yield in Kerala. Advances in tropical sericulture, Proc.of Natl.Conf.on strategies for Sericulture Research and Development. CSR&TI, Mysore. pp. 575-577.

Raghu, B.V., Siddappaji, C., Reddy D.N.R. and Sannappa, B. (1999). Sericulture technology adoption in Kolar district. Proc. of National seminar on tropical sericulture 1999, Dec.1999, UAS, Bangalore. Eds. Chinnaswamy K.P., Govindan R., Krishnaprasad N.K. and Reddy D.N.R:, UAS, Bangalore, 130.

Sudhakar Rao, P., Subramanyam, D., Mogili, T., Rajan, R.K and Prabhakar (2002). Improved rearing technologies and cocoon productivity.*Indian Silk,* **41**(1):19-22

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