Agriculture Update | Vol. 6 | Issue (3&4) | Aug. & Nov., 2011 | 170-174 | *RESEARCH ARTICLE*

Studies on the impact of selected sericultural technologies in Kolar disitrict

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

See end of the article for authors' affiliations

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

ABSTRACT

A study was conducted to assess the adoption impact of technologies and its influence on the cocoon yield. The data were collected from 108 farmers of traditional sericultural area of Kolar district of Karnataka. In the present study, attempts have been made to identify and advocate the need based technologies for the selected farmers along with requisite motivational efforts through personal interactions and group discussions held over a period of two years. Initial diagnostic study was conducted through structured proforma and impact survey was carried out and crop performance data computed for the 1st and 2nd years, which recorded an increase of cocoon yields by 8-19 kg/100 dfls among the target farmers. Among the technologies covered in the study, application of farmyard manure, separate chawki garden, separate chawki rearing room, proper disinfection of rearing house and equipments, black boxing and incubation of eggs, shoot feeding under shelf-rearing and use of bed disinfectants mainly contributed for the increased cocoon yields.

Shobha Rani, M., Dinesh Kumar, G.D., Krishna Murthy, R., Raveendra, H.R. and Bongale, U.D.(2011). Studies on the impact of selected sericultural technologies in Kolar disitrict. *Agric. Update*, **6**(3 & 4): 170-174.

Key words :
Impact survey, New technologies, Sericulture

Received:
Jul., 2011;
Revised:
Sep., 2011;
Accepted :
Oct., 2011

INTRODUCTION

Being a rural based labour intensive industry, sericulture is ideally suited for improving the social and economical standards of the rural poor (Geetha *et al*, 2001). Technologies developed by the institutes generally aim at improving the productivity (Hiriyanna and Vijayaprakash, 2003 and Sudhakar Rao *et al.,* 2002) and in recent years traditional sericulture farmers are increasingly coming forward to adopt the new technologies. Successful mulberry cultivation and silkworm rearing call for some optimum conditions such as soil fertility management, good race, separate rearing house, proper disinfection, good cocooning equipments etc. Present study was undertaken to assess the prevailing cultivation and rearing practices in relation to the corresponding yield gaps and to identify major factors that contribute to the differential yield levels among the farmers.

METHODOLOGY

The study was conducted for two years during 2006-2008 in seven villages namely, Amblipura, Vijayapura, Cholaghatta, Neelakantapura, Sonnallipura, Kendanahalli and Nallaganahalli of Kolar district, representing major traditional sericultural area of Karnataka. Benchmark survey was conducted to identify the crucial technologies responsible for the cocoon production before commencement of the work. Soil fertility management, maintenance of separate chawki garden, effective disinfection of rearing house and equipments, incubation and black boxing of eggs, shelf method of rearing with shoot feeding and use of bed disinfectants for late age silkworms were accordingly identified as crucial technological gaps. Soil and leaf samples from 108 farmers' gardens covering these seven villages were collected and analyzed to assess the soil fertility and leaf nutritional levels among target farmers of the study area. Further, for intensive study, 21 among these 108 farmers, were selected based on their willingness to adopt the suggested technologies. The selected farmers were grouped in to High (H), Medium (M) and Low (L) cocoon yield farmers based on the cocoon yields of >70kg, 50-60kg and <50 kg/100 dfls, respectively. Regular interactions on one-to-

one basis and periodical group discussions among these farmers were held for two years along with motivational efforts for technological interventions as were enlisted for respective farmers and groups. Impact survey was carried out and crop performance data computed for 1st and 2nd year apart from compiling the information pertaining to the technologies and response of each of the farmers during the course of the study.

OBSERVATION AND ANALYSIS

The results of the present study as well as relevant discussions have been presented under following sub heads:

Bench mark survey:

16 per cent of the respondents had mulberry garden less than 1 acre. Among different types of manurial combinations recorded, a maximum farmers (28 per cent) applied ammonium sulphate along with farmyard manure, this was followed by 19 per cent of the farmers applying complex with farmyard manure. Maintenance of separate chawki garden for feeding chawki worms was recorded with 28 per cent of the farmers. 62 per cent of the farmers depended on cross breed silkworms and only 39 per cent followed shelf-method of rearing for late age worms. Awareness of using black box was recorded to the extent of 90 per cent of farmers (Table 1).

Soil fertility status of target farmers:

The data (Table 2), revealed that the average soil p^H was slightly acidic (6.9) and it is suitable for mulberry cultivation. EC (0.48) and OC (0.63per cent) were medium when compared to normal range limits. Phosphorus, potassium and micronutrients (Fe, Zn, Mn and Cu) were more than the optimum level. Zinc deficiency (>2ppm) was recorded in majority of the gardens in seven villages.

Table 1 : Benchmark survey information on study farmers (n=108)

	No. of farmers	percentage
Mul.garden (acre)		
<1	17	16
1-3	68	63
>3	23	21
Applicationof manure		
FYM	3	2.8
FYM+Cmpx	20	19
FYM+AS	30	28
FYM+UR+Cmpx	10	9
FYM+Cmpx+AS	14	13
FYM+BF	6	6
Mixed	25	23
Separate chawki garden		
Yes	30	28
no	78	72
Disinfection		
Fmln	12	11
Bl pdr	1	0.92
Lime+Fmln+BL	5	5
Sntch+Lime+BL	10	9
Mixed	80	74
Race		
CB	67	62
CB+BV	41	38
Rearing method		
Shelf	42	39
Tray	66	61
Use of black box		
Yes	97	90
No	11	10

Note: No. of villages= 7, No. of farmers =108, FYM=Farmyard manure, Cmpx=Complex, AS= Ammonium sulphate, BL=Bleaching powder, CB=Cross breed, BV=Bivoltine, Mixed=using various kinds of manures and disinfectants.

Table 2 : Soil fertility status of target farmers mulberry gardens of Kolar district (n=21)

	pH	EC	OC (%)	N (kg/acre)	P (kg/acre)	K (kg/acre)	Zn (ppm)	Fe (ppm)	Cu (ppm)	Mn (ppm)
Average	6.90	0.48	0.63	1314.53	14.76	104.21	3.41	20.88	4.71	25.34
High	7.01	0.45	0.82	1350.43	14.00	133.00	2.78	18.26	6.32	20.64
Medium	6.82	0.50	0.61	1256.57	16.71	95.43	5.03	17.97	4.57	22.51
Low	6.84	0.55	0.55	1251.86	14.43	101.43	2.89	24.34	5.03	22.98
F test	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CD @ 5%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
CD @ 1%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 3 : Leaf nutrient status of target farmers mulberry gardens of Kolar district (n=21)

	Cu (ppm)	Fe (ppm)	Mn (ppm)	Zn (ppm)	Ca (%)	Mg (%)	P (%)	K (%)	Sugar (%)	Protein (%)
Average	8.48	178.75	47.61	30.50	1.19	0.90	0.60	1.05	12.21	25.03
High	9.45	172.43	56.73	29.80	1.72	0.99	0.86	0.90	13.08	26.26
Medium	9.25	174.31	53.89	29.56	1.16	0.95	0.75	0.80	12.60	25.63
Low	8.37	185.60	44.09	35.44	1.46	0.83	0.63	1.01	12.58	24.83
F test	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CD @ 5%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
CD @ 1%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Leaf nutritional status of target farmers:

Zinc and manganese deficiency was recorded in all the 21 gardens of High, Medium and low cocoon yielding farmers, registered <37 ppm, <35 ppm, respectively (Table 3). Gardens of high and low cocoon yielding farmers showed sufficiency in the calcium content (>1.25 per cent) while deficiency of potassium found in all the gardens (<1.16 per cent).

Extent of adoption of suggested technologies by different categories of farmers:

In case of the high group of farmers, 100 per cent adoption was observed for certain crucial technologies like application of farmyard manure at recommended dose, separate chawki rearing room, egg incubation, black boxing and use of bed disinfectants (Table 4). 86 per cent of the farmers adopted technologies like application of bio-fertilizers, separate chawki garden, effective disinfection of rearing house and equipments (round tank method). Shoot feeding technology was adopted by 71per cent of the farmers.

In case of Medium group of farmers, high adoption rate was observed for technologies such as soil test based fertilizer application (86per cent), separate chawki garden (71per cent), separate chawki rearing room (85per cent), egg incubation (100per cent), black boxing (100per cent) and using bed disinfectants (100per cent). Similarly proper disinfection of rearing house and equipments was found with 100per cent. Among other technologies, application of bio-fertilizers and shoot feeding technology were implemented by about 29per cent of farmers each.

Among the Low group of farmers, 100per cent adoption rate was observed for technologies such as egg incubation (by using mud pot) and black boxing. Using bed disinfectants Suraksha and Sanjeevini was recorded to the extent of 71 per cent, while the application of farmyard manure in required quantity, application of bio-fertilizers (Prakruthi and Seriphos) were practiced by 43 per cent of the farmers. Technologies like separate chawki garden, effective disinfection of rearing house and equipments, chawki rearing room and shoot feeding technology were adopted by 29, 57 and 29 per cent of farmers, respectively.

It is evident from the earlier reports that higher levels of productivity could be achieved by adoption of new technologies (5-9). An analysis of data from the present study showed that increase in cocoon yields was more in Medium group of farmers (19 kg) which could be attributed to full adoption of suggested technologies. 100per cent adoption with respect of farmyard manure

Table 4 : Extent of adoption of suggested technologies by the different categories of target farmers (% of 7 farmers in each category)

Technologies	High group of farmers	Medium group of farmers	Low group of farmers
Application of farmyard manure (20 tonnes/acre)	100	86	43
Application of biofertilizers-Prakruthi, Seriphos	86	29	43
Separate chawki garden	86	71	29
Effective dis-infection of rearing house and equipments-round tank method	86	100	57
Separate chawki rearing room	100	86	29
Egg incubation	100	100	100
Black boxing	100	100	100
Shoot feeding	71	29	29
Bed disinfectants-Suraksha, Sanjeevini	100	100	71

was recorded in High group of farmers followed by Medium and Low groups of farmers in that area. These results are in agreement with the earlier reports on the level of adoption which recorded that extent of adoption in respect of farmyard manure among different categories of farmers was in the order of big farmers followed by small and marginal farmers (1-11). Success in silkworm rearing mainly depends on the quality of mulberry leaves fed and application of requisite dosage of farmyard manure is one of the quickest means of increasing foliage yield and quality (Chaluvachari *et al,* 2002). Application of farmyard manure (preferably in two split doses) could be promoted effectively among the High and Medium group of farmers while, among Low group the limitation was its limited availability and high cost of those input.

Technological interventions and the results:

The average yield/100 dfls which was 74.71kg in H group of farmers before adoption of technologies went up to 82.5kg/100 dfls after adoption. In M and L group of farmers average yield/100 dfls which were 54.57kg and 45.5kg/100 dfls before adoption of technological interventions increased to 73.85kg and 58.11kg/100 dfls respectively (Table 5).

Table 5 : Cocoon yields after technological interventions among the target farmers

Farmers code	Yield during benchmark survey (kg/100dfls)	I year	II year
H*	74.71	76.17	82.5
M*	54.57	72.05	73.85
L*	45.5	56.0	58.11

Note: H=high group of farmers, M=medium group of farmers, L= low group of farmers

Among other supportive technologies on mulberry, biofertilizers needed further promotion among the Medium and Low groups who expressed the limitations pertaining to the expiry dates of the inoculum and complexity of application procedure. In this context, promotion of green manure and bio waste conservation and re-cycling through composting/vermi composting attains greater significance particularly among the low group of farmers. Reddy *et al.*(2003) recorded improvement in the leaf yield apart from marginal improvement in leaf quality owing to applications of vermicompost to the mulberry gardens. Similarly, Bhogesh *et al.* (2003), also reported that it is possible to reduce the application of farmyard manure to the greater extent through the application of nutrient rich vermicompost made by sericulture waste without any adverse effect on leaf yield and quality. Maintenance of separate chawki garden (advocated with S36 variety) for feeding young silkworms could be adopted by 29per cent among the Low groups compared to the majority among the High and Medium groups (86 and 75per cent respectively), though is considered to be a crucial input, is infact more suitable for the commercial chawki centers (CRCs) and large farmers.

Effective disinfection of rearing equipments by using round tank method containing bleaching powder considered to be an efficient and suitable technology was adopted by nearly all the farmers among the High and Medium groups (100 and 86per cent, respectively) and by about one third among the Low groups and this is possibly owing to their small land holdings who own a small dwelling place which is shared for rearing and hence one constrained on space. Similar observations (as also comparable with separate chawki garden) were recorded in respect of separate rearing space/room for young age (chawki) silkworm rearing. Chlorinated compound like bleaching powder can effectively kill the pathogen (Fujiwara *et al.,* 1992) and thus is used as an effective disinfectant. Among other technologies, simple and easy to handle technologies such as egg incubation, black boxing were more readily accepted and adopted by all the 21 farmers covered in the study. Shoot feeding under shelf-rearing was popular among the High group of farmers, requirement of more space, preference to traditional practice, lack of awareness and high cost of requisite infrastructure were the reasons for non-adoption. Farmers also expressed the constraint that early detection of ripening worms in 3rd and 4th tier of shelf would be difficult resulting in spinning in the rearing bed itself. Advantages of shoot rearing method in saving considerable time, lobour and also yield improvements and its specific suitability to semi-arid regions is well documented.

Conclusion:

Overall improvement of cocoon yields of 8-19 kg/ 100 dfls was recorded in the present study and, proper adoption of improved sericulture technologies helped the farmers to harvest good cocoon yields resulting in an increase in their income. Adoption of improved technologies among the Medium performing farmers was more encouraging with increase of 19 kg of cocoons/100 dfls owing to the adoption of technologies. The present study revealed that greater scope

for further strengthening the technology support through need-based extension approaches.

Authors' affiliations:
G.D. DINESH KUMAR, Department of Soil Science and Agricultural Chemistry, College of Agriculture, V.C. Farm, MANDYA (KARNATAKA) INDIA
R. KRISHNA MURTHY, Department of Horticulture, PONNAMPET (KARNATAKA) INDIA
H.R. RAVEENDRA, Department of Plant Pathology, Zonal Agricultural Research Station, V.C. Farm, MANDYA (KARNATAKA) INDIA
U.D. BONGALE, Karnataka State Sericulture Research and Development Institute, Thalaghattapura, BANGALORE (KARNATAKA) INDIA

REFERENCES

Bhogesha, Das, K. P.K., Madhava Rao Y.R. and Himanthraj, M.T. (2003). Effect of compost and vermicompost of sericultural origin on mulberry leaf yield and quality under irrigated condition. *Adv. in Indian Seri. Res.,* pp.169-173.

Chaluvachari, U.D., Bongale, Manjunath, M.S. and Anantharaman, M.N.(2002). Soil fertility, leaf quality and cocoon crop performances in bivoltine seed area Anekal in Karnataka. *Bull.Indian Acad.Seric.,* **6**:57-62.

Fujiwara, T., Kumari, K.V. and Nageshwara Rao, S. (1992). Pebrine and its control, disinfection for pebrine disease. Bivoltine Sericulture Technology Project in India, CSRandTI, Mysore, 9 P.

Geetha, G.S., Srinivasa,G., Jayaram,H., Iyengar,M.N.S. and Vijayaprakash, N.B. (2001). Socio-economic determinations of farmer oriented technology packages for sericulture-A field study. *Indian J.Seric*., 96-99.

Hiriyanna and Vijayaprakash, N.B.(2003). Impact of adoption of shoot rearing method. *Indian Silk.*,11-13.

Reddy, B.K. , Ram Rao,D.M., Reddy, M.P. and Surya narayana, N. (2003). A comparative study on the effect of FYM and Vermicompost on mulberry leaf yield and silkworm cocoon production under semi arid conditions of Andhra Pradesh. *Adv. in Seri. Res.*,pp.216-219.

Sudhakar Rao, P. Subramanyam, D., Mogili, T., Rajan R.K and Prabhakar (2002). Improved rearing technologies and cocoon productivity. *Indian Silk*., 19-21.

****
******