



ISSN (E): 2277-7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2022; SP-11(12): 23-27  
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Received: 01-10-2022

Accepted: 06-11-2022

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## Knowledge of sericulturists on improved bivoltine silkworm rearing practices

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### Abstract

The study was conducted during 2020-21 to analyze the profile characters and knowledge of bivoltine silkworm rearers in Kolar and Chikkaballapur districts of Karnataka state. Thirty silkworm rearers practicing bivoltine silkworm rearing were randomly selected in these two districts. The major findings revealed that, the larger number of bivoltine silkworm rearers were middle-aged (53.33%), small-scale farmers (53.33%) with medium income group (43.34%) having small-scale households (43.33%) and studied up to graduation (26.67%). Further, a greater proportion of bivoltine silkworm rearers were belonged to medium level of sericulture experience (46.66%) with innovativeness (47.50%), achievement motivation (50.00%) and mass media exposure (36.67%). Majority of the bivoltine silkworm rearers were having high level of extension agency contact (53.33%) and extension participations (53.33%). Majority of the bivoltine silkworm rearers' possessed high knowledge (53.34%) followed by medium (23.33%) and low (23.33%) knowledge on recommended mulberry cultivation practices. Similarly, bivoltine silkworm rearers also possessed high knowledge (46.68%) followed by medium (36.66%) and low (16.66%) knowledge with regard to improved silkworm rearing practices.

**Keywords:** Sericulturists, bivoltine silkworm, rearing practices

### Introduction

Sericulture is a farm based labour intensive activity falling under the small cottage sector. In India, sericulture has proven to be a suitable vocation for inclusive development of the rural population, particularly the poorer sectors of society, addressing equity distribution from urban privileged to rural poor. Sericulture stands for livelihood opportunity for millions of people owing to its high employment potential with low capital requirement and ensured remunerative nature. The country has produced 34,923 MT of raw silk against the target of 39,500 MT during 2021-22 achieving 88.4 per cent of the target and out of total raw silk production, bivoltine raw silk comprises of 7,978 MT (Anonymous, 2022) <sup>[1]</sup>. Although sericulture is considered as subsidiary occupation, technical advancements have enabled it to be practiced on a large scale capable of generating sufficient income. It can also provide farmers with a steady source of income. Considering the need of producing higher-grade raw silk in bulk, particularly bivoltine, to minimize imports and create more jobs in rural and semi-urban areas through enhanced sericulture standards. The Government of India is making all efforts to curtail the import of bivoltine raw silk by increasing quality of domestic production. Recently, Central Silk Board is planning to focus on expanding the mulberry cultivation in the state by increasing the area of sericulture from non-sericulture zones in north Karnataka due to increase in the global silk demand. This in turn, will make India self-reliant and there will not be any need to import raw silk from China. The major cocoon production is coming from the South-eastern dry zone, viz., Bengaluru urban, Bengaluru Rural, Ramanagara, Chikkaballapur and Kolar districts. The demand-supply gap of silk in India is widening and there is a need to improve the production and quality of silk to meet the requirement of domestic market to become self-reliant. Further, to plan suitable intervention strategies and to bridge the gap, it is necessary to understand present knowledge level for improved production technologies and profile characters of the farmers. In this regard, present study was conducted to understand the profile characteristics of sericulturists and to assess the extent of knowledge of sericulturists on improved sericulture technologies of the farmers of south-eastern dry zone of Karnataka state.

## Materials and Methodology

The present study was conducted in traditional sericultural belt of south-eastern dry zone of Karnataka *i.e.*, Kolar and Chikkaballapur districts during the year 2020-21. Fifteen villages from Chikkaballapur (7 No.) and Kolar (8 No.) districts were randomly selected for the study. Thirty silkworm rearers practicing bivoltine silkworm rearing from both Chikkaballapur and Kolar districts are randomly selected for the study. Data was collected by using a pretested interview schedule by employing personal interview method. Statistical tools like mean and standard deviation were used to analyze the data.

## Results and Discussion

### a) Profile Characteristics of Sericulturists

Majority of the bivoltine silkworm rearers belonged to middle age category (53.33%) (Table 1). The possible reason for the above trend might be the middle aged silkworm rearers are comparatively having free hand in financial affair and they can take up independent decision to implement their ideas (Kiran and Shenoy 2010) [4]. With respect to education more number of bivoltine silkworm rearers had studied up to high school (26.67%) and graduation (26.67%) level of education. The high literacy level in bivoltine silkworm rearers could be attributed to high family income as well as the accessibility of appropriate college facilities in the surrounding area. However, lack of interest and encouragement from family members and a poor economic situation can all contribute to illiteracy (Rajeshwar *et al.*, 2019) [11]. More than two-fifth of bivoltine silkworm rearers had small sized families (43.33%) and all silkworm rearers practiced agriculture as a main occupation followed by other allied activities such as sericulture, dairy, etc. As high as 46.66 per cent of bivoltine silkworm rearers had medium level of experience in sericulture. Majority of bivoltine silkworm rearers are practicing bivoltine rearing from last few years hence they are having medium level of experience (Hadimani *et al.*, 2017) [2]. Majority of the bivoltine silkworm rearers interviewed were small farmers (53.33%) because of silkworm rearers had land holding size in between 2.5-5 acres, this could be attributable to the recent land fragmentation (Imrankhan *et al.*, 2019) [3]. More than two-fifth of the bivoltine silkworm rearers belonged to medium income category (43.34%). The reason might be the land holding size and income from other allied activities like sericulture, horticulture and animal husbandry which contribute to the annual income of silkworm rearers. More number of bivoltine silkworm rearers belonged to medium level of innovativeness (47.50%), medium mass media exposure (36.67%) and medium level of achievement motivation (50.00%) as it plays a greater role in the individual's personality, respectively. In bivoltine silkworm rearing, majority of the silkworm rearers had high extension agency contact (53.33%). This might be due to the fact that in bivoltine silkworm rearing majority of rearers are literates and they are more interested towards extension activities. Forty per cent of bivoltine silkworm rearers belonged to high level extension participation. This is because most of the bivoltine silkworm rearers are literates and they are more enthusiastic to get exposure towards new technologies and their self-interest towards extension activities (Imrankhan *et al.*, 2019) [3].

### b) To assess the knowledge level of sericulturists on improved sericulture technologies

All bivoltine silkworm rearers had cent per cent correct knowledge on recommended mulberry variety (V-1) (100.00%) and method of harvesting (100.00%) of mulberry leaf. A majority of the bivoltine silkworm rearers having correct knowledge on yield to be obtained per ha per year (96.60%), intercropping (93.40%), method of planting (86.70%), pest incidence in mulberry (86.67%), quantity of vermicompost to be applied per ha (86.60%), suitable soil for mulberry cultivation (73.40%), mulberry plantation spacing (73.40%), irrigation schedule (70.00%), diseases in mulberry (66.67%), number of harvests per ha per year (63.34%) and plant protection measures (60.00%) (Table 2).

The majority of bivoltine silkworm rearers lacked proper knowledge of vermicompost or compost preparation and a few rearers just knew about chemical methods of plant protection but not the application technique or timing. In addition, they are unable to distinguish between disease and deficiency symptoms in the mulberry garden. The lack of individual interest in plant protection training programmes, as well as the lack of education on these issues could be the cause of acquiring incorrect knowledge. The present results are in line with findings of Shreedhara (1996) [13] and similar findings are also made by Meenal and Rajan (2007) [18].

### c) Overall knowledge of bivoltine silkworm rearers on recommended mulberry cultivation practices

Majority of bivoltine silkworm rearers belonged to high knowledge category (53.34%) followed by medium (23.33%) and low (23.33%) knowledge categories (Table 3). More number of bivoltine silkworm rearers belonged to high knowledge the reason for this could be that, the majority of rearers between the ages of 40 and 45, which makes them more enthusiastic about learning new things and the majority of rearers are well educated and actively participated in extension activities.

They also visited agriculture and sericulture departments on a regular basis, as well as taking part in various training programmes, demonstrations, field trips and tours, which may have assisted them in gaining more knowledge. The present results are supported by the findings of Raja Reddy (1992) [10] who reported that, frequent contact with extension agency and high mass media participation help the silkworm rearers to acquire correct knowledge.

### d) Knowledge of bivoltine silkworm rearers about specific silkworm rearing practices

All the bivoltine silkworm rearers had correct knowledge on separate rearing house (100.00%), types of rearing houses (100.00%), improved silkworm breeds (100.00%), method of rearing (100.00%), days required for cocoon harvesting (100.00%) and bed waste utilization (100.00%). A vast majority of the bivoltine silkworm rearers had correct knowledge on proper ventilation management inside rearing hall (90.00%), method of disinfection of rearing hall (90.00%), chemicals used for disinfection (90.00%), moulting care (90.00%), disease management (86.67%), pest management (83.33%), feeding frequency (80.00%), temperature management inside rearing hall (76.67%), relative humidity management inside rearing hall (70.00%), density of mounting (76.67%), quantity of disinfectants used for disinfection of rearing hall (63.33%), mulberry fruit utilization (63.33%), silkworm excreta utilization (63.33%)

(Table 4). This is because of the fact that they are more literate and regularly exposed to various extension programmes like trainings, demonstrations, field day conducted by the developmental departments and also undergone trainings *i.e.*, Japan International Commission on Agriculture (JICA) and Institute Of Village Linkage Programme (IVLP) projects.

Majority of the bivoltine silkworm rearers had incorrect knowledge regarding bed cleaning (70.00%), byproduct utilization (60.00%) and more than one fourth of bivoltine silkworm rearers had incorrect knowledge regarding cocoon

grading (46.67%) (Table 4). More number of silkworm rearers had incorrect knowledge regarding bed cleaning, byproduct utilization and cocoon grading because of less importance given to these aspects and also the individual interest towards participation in different training programmes conducted by extension departments and lack of extension agency contact could be the reason for incorrect knowledge. Similar results were earlier reported by Sariful Islam (2004)<sup>[12]</sup>, Mani *et al.* (2006)<sup>[7]</sup> and Lakshmanan and Geetha Devi (2007)<sup>[5]</sup>.

**Table 1:** Profile of the bivoltine silkworm rearers.

Sl. No.	Characteristics	Category	(N=30)	
			Frequency	Percentage
1	Age (years)	Young (< 35 )	5	16.67
		Middle ( 36 – 55 )	16	53.33
		Old (> 55 )	9	30.00
2	Education	Illiterate	3	10.00
		Primary school	0	0.00
		Middle school	1	3.30
		High school	8	26.67
		PUC	5	16.67
		Graduate	8	26.67
		Any other (Diploma, ITI)	5	16.69
3	Family size (No.)	Small (< 4 )	13	43.33
		Medium ( 5 – 8 )	9	30.00
		Large (> 8 )	8	26.67
4	Occupation	Agriculture	30	100.00
		Other allied activities	30	100.00
5	Experience in sericulture (years)	Low (< 10 )	4	13.34
		Medium (10 – 20 )	14	46.66
		High (> 20 )	12	40.00
6	Land holding (acres)	Marginal farmers (< 2.5 )	8	26.67
		Small farmers ( 2.5 – 5 )	16	53.33
		Big farmers (> 5 )	6	20.00
7	Annual Income (Rs in lakh)	Low (< 3 )	11	36.66
		Medium ( 3 – 6 )	13	43.34
		High (> 6 )	6	20.00
8	Innovativeness	Low	3	10.00
		Medium	19	63.34
		High	8	26.66
9	Achievement motivation	Low	6	20.00
		Medium	15	50.00
		High	9	30.00
10	Mass media exposure	Low	9	30.00
		Medium	11	36.67
		High	10	33.33
11	Extension agency contact	Low	8	26.67
		Medium	6	20.00
		High	16	53.33
12	Extension participation	Low	9	30.00
		Medium	9	30.00
		High	12	40.00

**Table 2:** Knowledge of bivoltine silkworm rearers on specific mulberry cultivation practices

Sl. No.	Particulars	(N = 30)			
		Correct knowledge		Incorrect knowledge	
		No.	%	No.	%
1	Recommended mulberry variety (V-1)	30	100.00	0	0.00
2	Suitable soil for mulberry cultivation (Red sandy loam)	22	73.40	8	26.60
3	Method of planting (Tree type/ Paired row system)	26	86.70	4	13.30
4	Spacing (240×240 cm / (90+150) × 120 cm)	22	73.40	8	26.60
5	Recommended FYM (20 MT/ha/year)	19	63.30	11	36.70
6	Recommended fertilizer (350:140:140 kg/ha/year)	12	40.00	18	60.00
7	Vermicompost preparation	5	16.60	25	83.40
8	Quantity of vermicompost to be applied (15 tones /ha/year)	26	86.60	4	13.40
9	Irrigation schedule (4-6 day interval)	21	70.00	9	30.00
10	Intercropping ( with crops )	28	93.40	2	6.60
11	Pest incidence in mulberry (Defoliators and sucking pests)	26	86.67	4	13.33
12	Disease incidence (foliar, stem and root diseases)	20	66.67	10	33.33
13	Plant protection measures (Physical, cultural, chemical and biological methods of control)	18	60.00	12	40.00
14	Harvests (5-6 times / ha / year)	19	63.34	11	36.66
15	Method of harvesting (Manual harvesting)	30	100.00	0	0.00
16	Yield (55-60 MT/ha/year)	29	96.60	1	3.40

**Table 3:** Overall knowledge level of bivoltine silkworm rearers about recommended mulberry cultivation practices

Sl. No.	Particulars	Frequency	Percentage
1	Low	7	23.33
2	Medium	7	23.33
3	High	16	53.34
Mean Score		12.33	
Standard Deviation		1.96	

**Table 4:** Knowledge of bivoltine silkworm rearers about specific silkworm rearing practices

Sl. no.	Particulars	(N = 30)			
		Correct knowledge		Incorrect knowledge	
		No.	%	No.	%
1.	Rearing house				
	a) Separate rearing house	30	100.00	0	0.00
	b) Types of rearing house	30	100.00	0	0.00
	c) Direction of rearing house	24	80.00	6	20.00
	d) Proper ventilation	27	90.00	3	10.00
2	Disinfection				
	a) Method of disinfection	27	90.00	3	10.00
	b) Chemicals used for disinfection	27	90.00	3	10.00
	c) Quantity used for disinfection	19	63.33	11	36.67
3	Temperature management	23	76.67	7	23.33
4	Relative humidity management	21	70.00	9	30.00
5	Silkworm breed	30	100.00	0	0.00
6	Method of rearing				
	a) Tray method of rearing	30	100.00	0	0.00
	b) Shoot method of rearing	30	100.00	0	0.00
7	Feeding frequency	24	80.00	6	20.00
8	Bed cleaning	9	30.00	21	70.00
9	Moulting care	27	90.00	3	10.00
10	Disease management	26	86.67	4	13.33
11	Pest management	25	83.33	5	16.67
12	Mounting management				
	a) Types of mountages	24	80.00	6	20.00
	b) Density of mounting	23	76.67	7	23.33
	c) Days required for cocoon harvesting	30	100.00	0	0.00
13	Cocoon grading	16	53.33	14	46.67
14	Transportation & marketing	22	73.33	8	26.67
15	By-product utilization				
	a) Remaining leaf	12	40.00	18	60.00
	b) Bed waste	30	100.00	0	0.00
	c) Silkworm excreta	19	63.33	11	36.67

**Table 5:** Overall knowledge of bivoltine silkworm rearers about improved silkworm rearing practices

Sl. No.	Particulars	Frequency	Percentage
1	Low	5	16.66
2	Medium	11	36.66
3	High	14	46.68
Mean Score		20.83	
Standard Deviation		2.01	

### e) Overall knowledge of bivoltine silkworm rearers about improved silkworm rearing practices

A greater proportion of the bivoltine silkworm rearers belonged to high knowledge (46.68%) category followed by medium (36.66%) and low (16.66%) knowledge categories on improved silkworm rearing practices (Table 5). This is because of the education level, frequent participation in different extension activities and mass media exposure. The results of the study were in consistency with Meenal (2006) [9]. The findings are also in line with the findings of Singhvi *et al.* (1993) [14] and Srinivasalu (1991) [15]. High knowledge on silkworm rearing technology was also reported by Mani *et al.* (2006) [7] in Tamil Nadu and Madhu Prasad (2006) [6] in Karnataka.

### Conclusion

The study revealed that in most of the improved technologies of sericulture, the knowledge level of the respondents was found high. Farmers had limited knowledge on few technologies, including vermicompost preparation, recommended fertilizer application per acre per year, proper disinfection methods and byproduct utilization. As a result, these factors may be taken into account when developing more training and awareness programmes for sericulture farmers in order to increase production and improve the quality of bivoltine silk to the desired level.

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