



Knowledge Gap of Silkworm Rearers of Jammu Division of Jammu and Kashmir State

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Authors' contributions

This work was carried out in collaboration between all authors. Authors LA and PSS designed the study and performed the statistical analysis. Author SKK wrote the protocol. Authors KAZ and NA wrote the first draft of the manuscript. Authors SK, BAL and MIB managed the analyses of the study. Author SKK managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2017/34786

Editor(s):

(1) Jagjeet Singh Gill, Assistant Professor, Institute of Agricultural Sciences, Chandigarh University, India.

Reviewers:

(1) Yakubu Balma Issaka, University for Dev't Studies, Ghana.

(2) Oladele Adekunle, University of Port Harcourt, Nigeria.

Complete Peer review History: <http://www.sciencedomain.org/review-history/21894>

Original Research Article

Received 12th June 2017
Accepted 6th November 2017
Published 14th November 2017

ABSTRACT

The present study was carried out to know the knowledge gap of silkworm rearers of Jammu division with 240 respondents were selected by proportionate random sampling method from three districts, six blocks and 24 villages. The data was collected by using a pretested structured interview schedule and knowledge test. Average age of silkworm rearers was 46.58 years, the average land holding in hectares was .83 and 29.11 percent of silkworm rearers possessed separate rearing shed. The overall mean knowledge score of three districts was 15.36 (\pm 2.29) with std. error .14756 and the maximum knowledge score was 22 and minimum knowledge score was 9 the difference was 33.21 per cent. Maximum difference was in case of disinfection and disinfectant which was 40.25 per cent followed by 38.57 percent about mulberry and its management and 37.50 per cent respondents about management of late age rearing. Kruskal Wallis test was applied to all the 23 statements and assign the ranks on the basis of chi square and p-value. The statements which were found significant thickness of cuttings of mulberry for propagation

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chi square value 9.021(.011), feeding requirement (kg/oz) for first instars larvae 7.535(.023), management of the diseases 5.508(.064) and dose of disinfectant used for silkworm rearing room and appliances for one ounce of seed 5.104(.078). All other knowledge statements were non significant.

Keywords: Silk worm; knowledge gap; Coccon; mulberry; disinfection; management.

1. INTRODUCTION

Silk, a way of life in India has become an inseparable part of Indian culture and tradition. India is the second largest producer of silk in the world with an annual silk of around 18500 tonnes. India has distinction of being the only country producing all four kinds of silk viz, Mulberry, Tasar, Eri and Muga [1]. However mulberry silk contributes more than 87 percent of the country's silk production.

Due to favourable climatic conditions, mulberry is cultivated mainly in five states of India namely, Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal and Jammu & Kashmir. These five states collectively account for 97 percent of the total area under mulberry cultivation and 95 percent of raw silk production in the country, [2].

Sericulture plays a vital role in the rural development in Jammu and Kashmir, as it integrates well with the farming systems and has potential to generate attractive income. It is remarkable for its low investment, quick and high returns that fits well into socio-economic conditions of India in general and Jammu and Kashmir in particular [3]. Sericulture is a subsidiary occupation for about 25000 rural families in the state. Most of these families belong to economically backward section of the society. Annually about 850 MTs of cocoons are produced generating an income of about Rs 1100 lac for these silkworm rearers coupled with annual employment generation to the tune of 6 lac man days [4].

In Jammu and Kashmir, sericulture industry, from rearing of worms to reeling of cocoons and weaving of silk is centuries old vocation. Agro based part of the industry is widely distributed where as industrial portion is restricted in Kashmir valley only. Raw silk produced is worldwide known as Kashmir silk being superior bivoltine type. Although this trade is centuries old in our state but were introduced in Jammu division only about 100 years back [5]. The practice of sericulture has been of recent origin in subtropical climate belt of Jammu division of

Jammu and Kashmir State starting in the beginning of last century. Bulk of the silkworm rearing is carried out on leaf obtained from the Government plantation on road sides, river bunds, wild plantation and government land. In spite of good returns in shortest possible time no attempts have been made to raise private mulberry gardens by the farmers mainly due to shortage of irrigated cultivable land and only single crop system of silkworm rearing [6].

Many production technologies for the promotion of sericulture have been developed by the state agriculture university/ Central silk research station Jammu, but there is no empirical data available to access the status of knowledge level, Knowledge gap and socio economic status of silk worm rearers.

Keeping in view of the facts a study was planned to know the socio economic status and knowledge level, knowledge gap of the silkworm rearers of Jammu division of J&K state to generate hard data about the socio- personal, technical and economic factors affecting the industry.

2. METHODOLOGY

The present study was conducted in Jammu division of Jammu and Kashmir State. The Jammu division comprises of ten districts. The silk worm rearers are found in all these districts. On the basis of number of silkworm rearers in each districts, the districts were categorized into three categories with i) Less than 500 rearers ii) 500-1000 rearers iii) Above 1000 rearers. From each of these categories, one district having highest number of silkworm rearers was selected. In this way, three districts namely Poonch, Reasi and Rajouri were selected from these categories for the purpose of study. Based on the number of silkworm rearers in a block, two blocks having maximum silk worm rearers from each district was selected purposively. Thus a total of six blocks was selected for the purpose of study. From each selected block four villages having maximum number of silkworm rearers were selected purposively. Thus, twenty four

villages were selected for the purpose of study. The descriptive cum diagnostic research design was employed for conducting the study. The respondents were selected by proportionate random sampling with a sample size of 240 respondents. Data were collected from the selected respondents with the help of semi-structured interview schedule by using the personal interview method. The respondents were interviewed either at their home, at community places or at their farms and their responses were recorded on the spot. The collected data were analyzed by using both parametric and non- parametric statistical tests namely percentages, mean standard error, F-test and Kruskal Wallis Test. The relationship between the independent variables and the dependent variable namely adoption of recommended sericulture technologies was analyzed using binary logistic regression model. Computer based SPSS programme was used for analyzing the data.

3. RESULTS AND DISCUSSION

3.1 Socio-economic Profile of Silkworm Rearers

The result showed that majority of respondents belongs to middle age group (40-56) years with average age of 46.58 years. The range was 21 to 81. Forty percent of respondents were middle pass, 22.91 were primary pass, only 3.33 per cent respondents were 10+2 pass and 24.58 per cent were illiterate with average schooling years completed of all the respondents were 5.70. Majority (56.67%) of respondents are having 5-7 members in their family with average family size was 5.28 members, 45 percent of respondents were having agriculture and sericulture as their main occupation, 37.08 per cent respondents were having agriculture, sericulture and labour as their main occupation and only 6.25 per cent were having business other than agriculture and sericulture. The average land holding was 0.83 ha and majority of them (68.33%) belong to marginal farmers, only 4.45 per cent belong to semi medium category and 0.42 per cent was landless.

3.2 Type of Rearing House

The data in the table indicates that 33.12 per cent respondents had dwelling house for rearing the silkworms followed by 29.17 per cent respondents who were having separate rearing

shed, 25.00 per cent respondents were having separate room in the dwelling house and 12.50 per cent respondents were using cattle shed as rearing house with highest in Poonch district (22.22%).

3.3 Sericulture Material Possession

The data in the Table 3 reveals that 88.89 per cent respondents were having rearing trays in Poonch district followed by 73.53 per cent in Reasi and Rajouri 57.06%. The overall percentage of the respondents who had possessed rearing trays was 64.17% per cent. The data further revealed that overall 60.00 per cent respondents had rearing stands, chopping board and chopping knives. Further data indicates that 58.82 per cent respondents in Reasi district were having dry and wet thermometers followed by Rajouri (35.88%) and Poonch (33.33%). Overall 38.74 per cent respondents had dry and wet thermometers, 43.33 per cent respondents had mount ages, 46.66 per cent respondents had bed cleaning nets, 45.00 per cent respondents had crates and 50.83 per cent respondents had sighries.

3.4 Knowledge Gap of Silkworm Rearers for Different Practices of Sericulture Management

The data presented in the Table 4 indicates the knowledge gap related to mulberry and its management, management of young age worms, disinfection and disinfectant, management of late age rearing and disease and insect pest management of silkworm. There was significant difference between the desired knowledge scores of respondents. The knowledge gap was quantified by subtracting the actual knowledge score from the desired knowledge score. Rajouri, Poonch and Reasi districts the maximum mean knowledge score related to mulberry and its management was 4.14, 4.60 and 4.79 and minimum mean knowledge score related to disinfection and disinfectant were 2.42, 2.30 and 2.30 respectively. Overall maximum mean knowledge score was 4.30 related to mulberry and its management and overall minimum mean knowledge score was 2.39 related to disinfection and disinfectant. The overall maximum difference was in case of disinfection and disinfectant which was 40.25 per cent followed by 38.57 per cent about mulberry and its management and 37.50 per cent respondents about management of late age rearing.

The table further revealed that 30.50 per cent respondents about management of young age rearing and the lowest difference was in case of disease and insect pest management.

Table 1. Socio-economic profile of silkworm rearers

S. no.	Particulars	Districts			Overall Percentage (n=240)
		Rajouri (n=170)	Poonch (n=36)	Reasi (n=34)	
1.	Age (% farmers)				
	i. (21-40) years	31.76	16.67	23.53	25.09
	ii. (40-56) years	51.18	58.33	55.88	52.92
	iii. (56-81) years	17.06	25.00	20.59	18.75
	Average age (years)	45.93	47.76	48.56	46.58
	S.D	±11.44	±11.73	±11.07	±11.42
	Std. Error	0.88	1.84	2.01	.74
2.	Education (% farmers)				
	i. Illiterate	24.12	25.00	26.47	24.58
	ii. Primary	18.23	20.44	35.29	22.91
	iii. Middle	41.18	41.67	32.36	40.00
	iv. Matric	10.59	11.11	02.94	09.58
	v. 10+2	05.88	02.77	02.94	03.33
	Average education(formal no. of schooling years completed)	5.83	5.03	5.75	5.70
	S.D	±3.68	±3.43	±3.74	±3.65
	Std. Error	0.28	0.62	0.59	0.24
3.	Size of family (% farmers)				
	i. 1-5 Members	38.82	08.33	08.82	30.00
	ii. 5-7 Members	52.36	69.45	64.71	56.67
	iii. 7-13 Members	08.82	22.22	26.47	13.33
	Average family size(No.)	4.98	05.92	06.12	5.28
	S.D	±1.23	±1.61	±2.16	±1.52
	Std. Error	0.09	0.27	0.37	0.1
4.	Occupation (% farmers)				
	i. Agriculture+Sericulture	40.59	61.11	50.00	45.00
	ii. Agri+Sericulture+labour	40.00	25.00	33.34	37.08
	iii. Agri+ Sericulture+Service	13.53	08.33	05.89	11.67
	iv. Agri +Sericulture+Business	05.89	05.56	08.82	06.25
5.	Average land holding (% farmers)				
	Land less silkworm rearers	0.59	0.00	0.00	0.42
	i. <1ha(marginal)	67.05	91.67	52.94	68.33
	ii. 1-2ha(small)	25.88	08.33	32.35	26.67
	iii. 2-4ha (semi-medium)	06.47	00.00	14.71	4.58
	Average operational land holding (ha)	.84	.50	1.10	0.83
	S.D	±.67	±.77	±.20	±0.65
	Std. Error	.05	.03	.13	.04

Table 2. Type of rearing house possessed by the silkworm rearers

Type of rearing house	District wise percentage of respondents			Overall percentage (n=240)
	Rajouri (n=170)	Poonch (n=36)	Reasi (n=34)	
Dwelling house	34.41	25.00	35.29	33.12
Separate room in the dwelling house	22.94	33.33	26.47	25.00
Separate rearing shed	30.00	19.44	35.30	29.17
Cattle shed	12.35	22.22	2.94	12.50

Table 3. Rearing equipment (material) possessed by silkworm rearers

Rearing equipments	District wise percentage of respondents			Overall percentage (n=240)
	Rajouri (n=170)	Poonch (n=36)	Reasi (n=34)	
Rearing Stands	52.30	88.89	73.53	60.80
Rearing Trays	57.06	88.89	73.53	64.17
Chopping Board	53.52	86.11	67.65	60.41
Chopping Knives	54.12	83.33	64.70	60.00
Bed Cleaning nets	38.24	69.44	64.70	46.66
Dry & Wet Thermometer	35.88	33.33	58.82	38.74
Mount ages	40.00	41.67	61.76	43.33
Crates	36.47	66.67	64.70	45.00
Sighries	42.94	72.22	67.65	50.83

Table 4. Knowledge gap of silkworm rearers in different practices of sericulture management

Practices	District wise mean knowledge Score			Mean knowledge score obtained	Maximum obtainable	Knowledge gap (%)
	Rajouri (n=170)	Poonch (n=36)	Reasi (n=34)			
Mulberry and its management	4.14	4.60	4.79	4.30	7.00	38.57
Management of Young age worms	2.82	2.57	2.82	2.78	4.00	30.50
Disinfection and disinfectant	2.42	2.30	2.29	2.39	4.00	40.25
Management of late age rearing	2.66	2.44	2.58	2.50	4.00	37.50
Disease and insect pest management	3.24	3.72	2.99	3.39	4.00	15.25

3.5 District Wise Difference in Mean Knowledge Score of Silkworm Rearers

The data presented in table indicates that in Rajouri district (n=170) the mean knowledge score was 15.28 and maximum knowledge score was 20 and minimum knowledge score was 9 and difference was 33.56 percent. In Poonch district (n=36) the mean knowledge score was 15.69 and the maximum knowledge score was 19 and minimum knowledge score was 12 and the difference was 32.04 per cent. In case of

Reasi district (n=34) the mean knowledge score was 18.47 and the maximum knowledge score was 22 and the minimum knowledge score was 9, the difference was 19.69 per cent.

It is finally concluded that in all the three districts the mean knowledge score was 15.36 with std. error .14756 and the maximum knowledge score was 22 and minimum knowledge score was 9 the difference was 33.21 per cent. The difference between the mean knowledge score of silkworm rearers in Rajouri, Poonch and Reasi was non-significant ($F=.888$, $p=.614$).

Table 5. District wise difference in mean knowledge score of silkworm rearers

Districts	N	Max. score obtainable	Max. mean score obtained	Diff.	Differences %	Std. error	Range	F-value / p-value
Rajouri	170	23	15.28	7.72	33.56	.16953	9-20	.888/.614
Poonch	36	23	15.63	7.37	32.04	.30556	12-19	
Reasi	34	23	18.47	4.53	19.69	.51752	9-22	
Total	240	23	15.36	7.64	33.21	.14756	9-22	

3.6 District Wise Mean Rank Score of Statements

The data in the table indicates the mean rank score of statements by applying Kruskal Wallis test. All the 23 statements were tested and assign the ranks on the basis of chi square and p- value. The statements which were found significant thickness of cuttings of mulberry for propagation chi square value 9.021(.011), feeding requirement (kg/oz) for first instars larvae 7.535(.023), management of the diseases 5.508(.064) and dose of disinfectant used for silkworm rearing room and appliances for one ounce of seed 5.104(.078). All other schemes were non-significant.

Majority of the silkworm rearers had medium knowledge of silkworm rearing practices. There was no significant difference among the mean knowledge score of the districts. But there was significant difference among the some knowledge statements. This might be due to the fact that the respondents of the three districts are exposed to almost the same level of information and knowledge by the development department. Their communication sources are alike. Transfer of technology mainly occurs through personal contacts, printed literature has no access to the silkworm rearers due to low to medium literacy rate. In addition the printed material needs financial implications which are very critically managed by the state line department. The study of [7] support the present study that majority of farmers had medium knowledge level.

Mulberry is a perennial crop of reasonably high drought tolerance capacity. The study indicated that majority of silkworm rearers had knowledge about time of pruning the mulberry trees, important insects of mulberry plants, type of mulberry plants bearing more leaves. Whereas, less percentage of respondents had knowledge

of length and thickness of mulberry cuttings for propagation and only 27.08 per cent of respondents had knowledge of improved variety of mulberry. The study of [8] related to improved variety of mulberry, fertilizer and plant protection measures support the present study and same finding were also reported by [9,10,11].

Majority of respondents had knowledge of methods of disinfecting the silkworm body and rearing seat. In contrast to this, one half of the respondents had knowledge of dose of disinfectants used for silkworm body and rearing seat and very low percentage of respondents had knowledge of dose of disinfectant used for silkworm rearing room and appliances. It is pertinent to mention that department of sericulture itself under take room and appliances disinfection every year. The possession of more knowledge regarding disinfecting silkworm body and rearing seat, may be because of the fact that there is frequent farmer to farmer communication as this venture is being practiced in the area more than four decades. The present study was in consonance with study conducted by [12].

High percentage of respondents had knowledge of moulting of silkworms and precautions taken for young age worms. Less percentage of respondents had knowledge of method of silkworm incubation. The simple reason for less knowledge of silkworm incubation is that silkworm rearers bring chawki worms from sericulture department. The study conducted by [13] also supports the present study. Majority of respondents had knowledge of control of insect/pest of silkworm, management of diseases, insect pest of silkworm and important diseases of silkworms. The finding of the study reveals that maximum numbers of the respondents were well versed with the critical input indicators of sericulture production technology. The finding supported with the study conducted by [14].

Table 6. District wise mean rank score of statements (Kruskal Wallis test)

Statements	Districts (Mean Ranks)			Chi- square (p-value)	Ranks
	Rajouri (n=170)	Reasi (n=34)	Poonch (n=36)		
Improved variety of mulberry	117.15	127.74	129.50	3.165(.205)	13
Best method of propagation	120.32	118.21	123.50	.176(.916)	23
Length of mulberry cuttings for propagation	115.15	132.09	134.83	4.655(.097)	8
Thickness of cuttings of mulberry for propagation	113.15	138.56	138.17	9.021(.011)	1
Plantation of mulberry plants yielding more leaves	121.85	130.32	104.83	4.986(.106)	5
Time of pruning mulberry trees	119.32	124.97	121.83	1.088(.580)	19
Important insect infestation of mulberry plants	117.71	126.88	127.67	2.227(.328)	17
Method of silkworm incubation	122.35	116.71	115.33	.777(.678)	21
Moulting in silkworm rearing	121.09	118.97	119.17	.854(.653)	20
Precautions taken for young age worms	119.74	123.97	120.83	.646(.724)	22
Feeding requirement (kg/oz) for first instars larvae	124.35	127.18	96.00	7.535(.023)	2
Methods of disinfecting silkworm body & rearing seat	117.88	128.47	125.33	3.325(.190)	12
Disinfectants use for silkworm rearing room and appliances	118.12	122.35	130.00	2.201(.333)	18
Dose of disinfectant used for silkworm body and rearing seat	125.48	107.21	105.80	4.953(.084)	6
Dose of disinfectant used for silkworm rearing room and appliances for one ounce of seed	124.06	115.59	108.33	5.104(.078)	4
Temperature Humidity requirement for young as well as late age rearing	124.29	117.68	102.06	4.442(.109)	10
Late age silkworm rearing technique	118.47	119.88	130.67	3.071(.215)	14
Feeding requirement in (kg/oz) for fifth instars larvae	125.15	117.38	101.50	4.865(.088)	7
Low cost devices for cocoon stifling	119.49	111.88	130.04	2.959(.228)	15
Important disease of silkworm	118.47	114.24	136.00	4.415(.110)	11
Management of the diseases	119.82	109.24	134.33	5.508(.064)	3
Insect pest of silkworm	118.58	112.38	133.86	4.529(.104)	9
Control methods for insect/pest	118.94	122.47	126.00	2.584(.275)	16

4. CONCLUSION

The result revealed that the average age of silkworm rearers was 46.58 years, the average land holding in hectares was .83 and 29.11 percent of silkworm rearers possessed separate rearing shed. The majority of the silkworm rearers had medium knowledge of silkworm rearing practices. There was no significant difference among the mean knowledge score of the districts. But there was significant difference among the some knowledge statements by applying Kruskal Wallis test. The statements which were found significant thickness of cuttings of mulberry for propagation chi square value

9.021(.011), feeding requirement (kg/oz) for first instars larvae 7.535(.023), management of the diseases 5.508(.064) and dose of disinfectant used for silkworm rearing room and appliances for one ounce of seed 5.104(.078).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://sciedomain.org/review-history/21894>