Plant Archives Vol. 23, No. 1, 2023 pp.111-115 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2023.v23.no1.019

ADOPTION OF IMPROVED MUGA CULTURE TECHNOLOGIES AMONG TRIBAL FARMERS IN ASSAM, INDIA

Vijay N.[1]*, D. Mech[1], S.A.S. Rahaman[1], D. K. Gogoi[2] and K. Sathyanarayana[3],
[1]Central Muga Eri Research Training Institute, Lahdoigarh, Jorhat , Assam India
[2]Regional Sericultural Research Station, KORAPUT, Odisha, India
[3]Central Tasar Research & Training Institute, Ranchi, India
*Corresponding Author Email : ntvijay@gmail.com
(Date of Receiving : 22-09-2022; Date of Acceptance : 27-12-2022)

ABSTRACT

Muga culture is an age old traditional practice in the north-eastern India. Especially in Assam, it is practiced as traditional household activity among the tribal farmers. The present study was conducted from 2019-2022 from CMER&TI, Lahdoigarh, under the DST Funded project to assess the knowledge and adoption level of improved muga culture technologies in tribal belt of Assam. Total of four muga producing districts *viz*., Lakhimpur, Dhemaji, Kamrup and Golpara were selected for the study. Consequently from each district 50 Scheduled tribes (ST) muga farmers were selected through random sampling technique. Hence a total of 200 ST muga farmers were selected as a beneficiaries of the project and transferred the improved technologies of muga culture through various extension programmes and farmers skill training programs. Farmers were also provided with minimum support to adopt the technologies in the field for successful crop production. The present paperhas portrayed the knowledge and adoption level of improved technologies among the beneficiaries before and after the project.

Keywords : Adoption, Knowledge, Muga Culture and Tribal farmers

Introduction

The muga silkworm, *Antheraea assamensis* is an endemic to Assam and its surrounding states; it is a unique gift to northeastern region of India for its lustrous golden yellow silk. The congenial climatic conditions and availability of food plants made is the main reason for the habitat of many sericigenous insects. From time immemorial, muga culture has been practiced by the rural folk and tribal people of the region and become basic source for their livelihood.

As per the census of 2011, schedule tribes were 12.42 % of total population in Assam state. Majority of these tribal'sare poor, marginal land holders. They cultivate a few crops like paddy once in a year, but muga is part and parcel of their life, culture,tradition, since its outdoor rearing, it can be reared in forest land and state government farms.

Central Muga and Eri Research and Training Institute (CMER&TI), Lohdigarh, Assam under the aegis of Central Silk Board, Ministry of Textiles, Govt. of India has developed and recommended several technologies and package of practices in muga culture (Chakravorty *et al*., 2005). However due to lack of appropriate extension mechanism of technology transfers tothe farmers was not attained. The lack of awareness about the technologies has created the barriers for successful crop production.The Production and productivity of muga culture mostly depends on the adoption of the latest technologies (Singh *et al*., 2014 and Goswami *et al*., 2015).

Materials and Methods

The present study was conducted from 2019-2022 from CMER&TI, Lahdoigarh, under the DST Funded project to assess the knowledge and adoption level of improved technologies of muga culture in the tribal belt of Assam. Total four muga silk producing districts viz., Lakhimpur, Dhemaji, Kamrup and Golpara were selected under the project. Consequently from each district 50 Scheduled Tribes (ST) were selected through random sampling technique. Accordingly a total of 200 ST muga farmers were selected as a beneficiaries of the project. A questionary format was prepared in consultation with the experts to assess the socio economic, personal, knowledge and adoption level of the selected beneficiaries.

Knowledge level of muga farmers was studied using the knowledge test developed by Kunzru and Tripathi (1994) based on the 'correct' and 'wrong' answer responded by the farmers with scoring of 'one' and 'zero' respectively. The mean was determined using the total score and number of total questions. Similarly, the adoption index of the respondents was measured by making use of following adoption index developed by Karthikeyan (1994). Scores '0', '1' and '2' assigned to non-adoption, partial adoption and full adoption respectively. The total score for a respondent is obtained by summing up the score obtained on each practice.

Thus minimum score one could score was zero and maximum score was 16.

A benchmark survey was conducted in 2019-20 to assess the knowledge and adoption level of the farmer by using the pre-structured questioner with 200 beneficiaries of the project. The selected beneficiaries were trained through various Extension communication program like field day, awareness program, technology demonstration and farmers' skill training program to impart the knowledge and adoption of improved technologies. The selected farmers werealso given minimum assistance for adopting improved technologies in the field. In order to know the knowledge and adoption level of the beneficiary farmers, after the inception of the project in 2021-22, again final survey is conducted. The collected data were analyzed with suitable statistical techniques.

Result and Discussion

Socio economic status of tribal population of the study area

It is evident from the Table 1 that majority (64.5%) of the farmers belonged to middle age group followed by young (20.0%) and old (14.5%) age group. Majority (70.5%) of the respondents were belonged to male category. Education level of majority of the farmers (50.0%) was up to secondary level followed by primary level (21.5%) and 11.0% farmers are Graduate and above. Family size of most of the farmers (60.5%) consists of 4-5 members followed by 26.5% more than 5 members and majority of the farmers (52.0%) considered agriculture as primary occupation followed by muga culture (36.0%). Majority (70.0%) of the respondents had less than 1.0 acre of land holding under muga host plantation. As regards to the sericulture-income, 63.5 % farmers had medium level of income ranged between Rs 12,500-37,600 and 20.5 per cent of the farmers had low level of income (<Rs 12500) .16.0 % farmers having more than Rs 37,600/- sericulture income Experience in muga culture was exhibited by majority (44.5%) of the farmers as 0-5 years followed by 32.0% of the farmers 5-10 years and 23.5% farmers as more than 10 years respectively. Young generation having age group less than 35 years are intentionally selected as they are more tending to adopt improved technologies and work efficacy can be increases. Similarly, People of the middle age group have more work efficiency and they have gathered more experience on muga culture over the years. However old age people having more experience are little reluctant to adopt new technologies but there is a scope to increase their knowledge and adoption rate. Vijay N *et al* 2020 reported that knowledge and adoption level of young generation are more compared to old generation in adoption of improved technologies.

Muga silkworm is reared in outdoor condition and the farmers need to have lot of skills to conduct muga silkworm rearing effectively. Male persons are highly skilled and well experienced on mugaculture. Hence, their involvement was also high. However now day's women are also doing the muga culture to help their family similar thing is also reported vijay N *et al* 2019. It is fact that education of individual determines their knowledge level and mental status and plays a key role in moulding and bringing desirable changes. Probably, the poor economic condition of the muga farmer and other social constraints made them to educate less, but as the trends are changing in the society, education level of some of the farmers are also gone up to graduate level. Mech *et al.* (2004), Goswami *et al.* (2015) Vijay *et al.* (2020) & Vijay *et al.* (2020) also reported the same level of education among the muga farmers. Many of the time, the farmers are failed to harvest good crops due various climatic condition and incidence of pest and disease of silkworm. In addition to that, sometimes farmers are taking only one or two crops in a year. Probably, due to these facts, the farmers considered the muga culture as secondary source of income considering the agriculture as primary.

The knowledge level of the farmers about the improved technologies of muga culture:

It was seen from the table2 that, overall average knowledge level of improved technologies in benchmark survey and postfinal survey was 32.0 percent and 59.0 percent respectively. There is increase in 84.37 % knowledge level of the farmers with respect to benchmark survey. In host plant management average knowledge level of improved technologies of 5 components of farmer in benchmark survey was 24.5 % while in final survey the knowledge level of the farmer is 61.0%, there is a remarkable 1228.58 % increase in the knowledge level of the farmer with respect to benchmark survey. In silkworm rearing management, there are 11 components of improved technologies of muga culture. In benchmark survey, the average knowledge level of improved technologies was 32.0% while in final survey it is 59.0%, there is increase in the knowledge level of 71.42% with respect to benchmark survey. Overall, the knowledge level of the farmers was increased about the improved technologies of muga culture. A similar result was obtained by Vijay *et al.* 2020 of studying knowledge level of farmers of trained and non-trained farmers of muga culture.

Knowledge test of the respondent on improved technologies of muga culture

The beneficiary Muga farmers are grouped in to three categories low, medium and high based on knowledge test /score on the improved technologies of muga culture in benchmark survey as well final survey. The group was made based on mean and standard deviations. It was seen from table 3 that mean knowledge test score of muga farmers is 31.84 with standard deviation of 11.41. The muga farmers having knowledge test score low or less than 20 on improved technologies of muga culture was 18.5 %, whereas the medium test score range 20-44 was 71.5 % and the high level knowledge test score was 10.0% only. Similarly, the knowledge test score of final survey was conducted in 2022 and it was seen table 4, that the medium knowledge (64.5%) level test score followed by low and high 18.5% and 17% respectively. The average knowledge test score of improved technologies of muga culture was 58.97 and standard deviation is 11.41. However, it was seen in table 5 that comparison of benchmark survey with final survey on knowledge test score on improved technologies of muga culture, it was observed that the in the final survey the low level of category are nil and decreased in comparison with benchmark survey similarly in medium level of test score. Furthermore it can be evident that the knowledge test score of individual after the final survey was increased nearly 143 farmers having knowledge test score more than 44. Farmers are gaining knowledge on improved technologies of muga culture through farmer's skill training program and various extension communication programs like field day, awareness

program, and technology demonstration. It was evident that the knowledge of the farmers can be increased from the above methods. The results of the study are in consistency with Vijay *et al* 2020.

Comparison of Benchmark survey and Final survey on Adoption level of improved technologies of muga culture:

The result of benchmark survey and final survey of adoption of improved technologies of muga culture was shown in the table 6. In the benchmark survey the adoption of improved technologies in host plant management 87.6% non-adoption followed by partial adoption of technology 10.8% and full adoption of technology is 1.6% of the total farmers. Similarly in silkworm rearing management 92.0% farmers are non-adoption of technology while 7.04% and 0.95% are partial and full adoption of technology. Overall, 90.62% farmers are non-adoption followed by partial and full adoption of technology 8.21 % and 1.15% respectively.

Final survey was conducted in 2021-22 to the beneficiary farmer under the study area after dissemination of improved technology of muga culture. In host plant management 42.7% farmers were non-adoption of technology while 44.5 % farmers were partial adopting the technology and remaining 12.8 % farmers were full adoption of technology, farmers have conservative attitudes and need more time and information to be persuaded to adopt new technologies. However, there is increase in the adoption of technology from benchmark survey which can be seem from the table 6 the number of non-adopter farmer were decreased, and partial and full adoption of technology farmer increases from benchmark survey was 323.8 and 550.0 % respectively. Farmers are adopting pruning, control stem borer, spacing of host plant and application of FYM as all this technology support was given in the project like distribution of chain saw to a group of 20 farmers. Distribution of some seedlings, fertilizers and technology demonstration of control stem borer.

The young and motivated farmers were using this technology in their field. Similarly, in the silkworm rearing management there were decrease in the number of non-adopters and increases in the partial and fully adoption of improved technologies which can be seen in the table 6. There was 442.8 % increase in the partial adopters and 2000% increase in the fully adoption of technology. However, rate of adopting the technologies like selection of seed cocoon, disinfection of rearing field and rearing appliances, improved bamboo mountage, use of dfls, lahdoi and pre bursting care are high and faster, whereas the technologies involvement of highly skilled like mother moth examination, egg surface sterilization, biological control of uzi fly required more time and advance training to adopt these technologies.

Conclusion

The present study revealed that, the knowledge and adoption of improved technologies can be increased with the help of extension activities and providing minimum assistance in adoption of improved technologies. A good extension service is essential for creating awareness and to transfer technologies. It will assist the farmers to acquire knowledge and adopt new technologies to increase the cocoon production as well income of the famers.

Table 1 : Socio-economic Status of tribal population: (N=200)

Sl. No	Attributes	Categories	Frequency	Percentage
1	Age	Young (Up to 35 years)	40	20
		Middle (36-56 years)	131	65.5
		Old (above 56 years)	29	14.5
2	Sex	Male	141	70.5
		Female	59	29.5
3	Caste	ST	200	100
4	Marital status	Unmarried	11	5.5
		Married	191	94.5
5	Education	Illiterate	15	7.5
		Primary level	63	21.5
		Secondary	100	50.0
		Graduate and above	22	11.0
6	Family size	Small (Up to 3 members)	26	13.0
		Medium (4 – 5 members)	121	60.5
		Big (Above 5 members)	53	26.5
7	Land area under muga food plants	< One acre	140	70.0
		One acre	37	18.5
		> One acre	23	11.5
8	Primary occupation	Agriculture	104	52.0
		Muga culture	72	36.0
		Other	24	12.0
9	Seri income	Low (<Rs.12500/-)	41	20.5
		Medium(Rs.12500-37600)	127	63.5
		High (Above Rs. 37600)	32	16.0
10	No of plants	<200	106	53
		200-400	75	37.5
		400-600	19	9.5

11	Rearing capacity	50-100	42	21
		100-200	71	37.5
		>300	87	9.5
12	Experience	0-5 years	89	44.5
		5-10 years	64	32.0
		>10years	47	23.5
11	No of Cocoons	>3000	139	69.5
		3000-6000	54	27.0
		>6000	7	6.5
12	BPL Card/Job Card	Yes	135	67.5
		No	65	32.5

Table 2: Knowledge level of farmers of improved technology of muga culture

	Knowledge	**BS**	**FS**	**% Increase /decrease**
Host plant management	Spacing of host plants	67(33.5)	133(66.5)	98.51
	Application FYM and NPK	17(8.5)	103(51.5)	505.88
	Intercropping	71(35.5)	127(63.5)	78.87
	Pruning schedule	31(15.5)	92(46)	196.77
	Control of stem borer	59(29.5)	106(53)	79.66
	Average	**49(24.5)**	**112(61.0)**	**128.58**
Silk worm rearing management	Mother moth examination	29(14.5)	53(26.5)	82.76
	Egg surface sterilization	37(18.5)	72(36)	94.59
	use of dfls	81(40.5)	134(67)	65.43
	Pre brushing care	93(46.5)	149(74.5)	60.22
	Early stage rearing	115(57.5)	162(81)	40.87
	Lahdoi	41(20.5)	156(78)	280.49
	Biological control of uzi fly	12(6)	37(18.5)	208.33
	Improved mountage	36(18)	63(31.5)	75.00
	Selection of seed cocoon	110(55)	166(83)	50.91
	Disinfection of rearing field	89(44.5)	158(79)	77.53
	Disinfection of rearing appliance	131(65.5)	176(88)	34.35
	Average	**70(35.0)**	**120(60.0)**	**71.42**
Overall Average knowledge of technologies		**64(32.0)**	**118(59)**	**84.37**

Parenthesis is in percentage

Table 3 : Knowledge test of respondents on improved technologies of muga culture in benchmark survey

N 200

levels	**Knowledge score**	**Frequency**
Low	<20	37(18.5)
Medium	20-44	143(71.5)
High	>44	20(10.0)
Benchmark survey Mean 31.84 SD 11.41		

Parenthesis is in percentage

Table 4: Knowledge test of respondents on improved technologies of muga culture in Final survey

N-200

Levels	**Knowledge score**	**Frequency**
Low	<46	37(18.5)
Medium	46-72	129(64.5)
High	>72	34(17.0)
Final survey Mean 58.97 SD 13.61		

Parenthesis is in percentage

Table 5: Knowledge test of respondents on improved technologies of muga culture in with respect of benchmark survey

N-200

levels	**Knowledge score**	**Benchmark Frequency**	**Final frequency**	**Percent change**
Low	<20	37(18.5)	0(0)	Decrease
Medium	20-44	143(71.5)	37(18.5)	Decrease
High	>44	20(10.0)	163(81.5)	increase
Mean 31.84 SD 11.41				

Parenthesis is in percentage

Table 6: Comparison of Benchmark survey and Final survey in Adoption level of improved technologies of muga culture.

		Benchmark			Final survey			Percentage increase/ Decrease wrt to Benchmark		
	Adoption /technologies	**No adoption (0)**	**Partial (1)**	**Fully (2)**	**No adoption (0)**	**Partial (1)**	**Fully (2)**	**No adoption**	**Partial (1)**	**Fully (2)**
Host plant management	Spacing of host plants	169(84.5)	26(13)	5(2.5)	88(44)	96(48)	16(8)	decrease	269.23	220.00
	Application of FYM/NPK to the host plants	187(93.5)	13(6.5)	0(0)	81(40.5)	95(47.5)	24(12)	decrease	630.77	2400.0
	Inter-cropping	153(76.5)	43(21.5)	4(2)	87(43.5)	81(40.5)	32(16)	decrease	88.37	700.00
	Pruning / Pollarding of host plant	179(89.5)	17(8.5)	4(2)	63(31.5)	93(46.5)	44(22)	decrease	447.06	1000.00
	Control of stem border muga host plants	188(94)	9(4.5)	3(1.5)	108(54)	80(40)	12(6)	decrease	788.89	300.00
	Average of Host plant management	**175.2(87.6)**	**21.6(10.8)**	**3.2(1.6)**	**85.4(42.7)**	**89(44.5)**	**25.6(12.8)**		**323.8**	**550.0**
Silkworm rearing management	Mother moth examination	200(100)	0(0)	0(0)	191 (95.5)	9(4.5)	0(0)	decrease	900.0	Not change
	Egg surface sterilization	191(95.5)	9(4.5)	0(0)	120(60)	68(34)	12(6)	decrease	655.56	1200.0
	Use of dfls	163(81.5)	30(15)	7(3.5)	80(40)	96(48)	24(12)	decrease	220.00	242.86
	Pre brushing care	181(90.5)	15(7.5)	4(2)	28(14)	102(51)	70(35)	decrease	580.00	1650.00
	Early stage muga silkworm rearing	173(86.5)	21(10.5)	6(3)	49(24.5)	121(60.5)	30(15)	decrease	476.19	400.00
	Lahdoi	200(100)	0(0)	0(0)	80(40)	90(45)	30(15)	decrease	9000.0	3000.0
	Biological control of Uzi fly	200(100)	0(0)	0(0)	175(87.5)	25(12.5)	0(0)	decrease	2500.0	Not change
	Improved Mountage	200(100)	0(0)	0(0)	120(60)	68(34)	12(6)	decrease	6800.0	1200.0
	Selection of seed cocoon	163(81.5)	33(16.5)	4(2)	10(5)	30(15)	160(80)	decrease	-9.09	3900.00
	Disinfection of rearing field	174(87)	26(13)	0(0)	24(12)	116(58)	60(30)	decrease	346.15	6000.0
	Disinfection of rearing appliance	179(89.5)	21(10.5)	0(0)	19(9.5)	111(55.5)	70(35)	decrease	428.57	7000.00
	Average of silkworm rearing management	**184(92.0)**	**14.09(7.04)**	**1.90(0.95)**	**81.5(40.75)**	**76.0(38.0)**	**42.55(21.27)**		**442.8**	**2000.0**
	Overall average of technologies	**181.25(90.62)**	**16.43(8.21)**	**2.31(1.15)**	**82.7(41.35)**	**80.06(40.03)**	**37.25(18.62)**			

Acknowledgement

This work was supported by the Department of science and technology (DST), New Delhi under Tribal sub plan (F.No TSP/009/2016)

References

Chakravorty, R.; Barah, A.; Neog, K.; Rahman, S.A.S. and Ghose, J. (2005). Package of practices of muga, eri and mulberry sericulture for North Eastern region of India, CMER & TI, CSB, Lahdoigarh, Jorhat, Assam.

Goswami, D.; Singh, N.I.; Ahamed, M.; Kumar, R. and Giridhar, K. (2015). Impact of integrated chawki rearing technology on cocoon production of muga silkworm *Antheraea assamensis* Helfer, *Biological Forum – An International Journal*. 7(1): 146-151.

Karthikeyan, C. (1994). Sugar factory registered growers: an analysis of their involvement and impact, M.Sc thesis (Unpublished) TNAU, Coimbatore.

Kunzru, O.N. and Tripathi, H. (1994). Research in Animal science: Measurement techniques, Indian Veterinary Research Institute, Izatnagar (UP), India.

Mech, D.; Borah, A.; Singh, K.C. and Surynarayana, N. (2004). Adoption of improved technology package and its impact on production in muga – A case study, *Indian Journal of Sericulture*, 43(1): 95-98.

Singh, N.I.; Goswami, D.; Ahmed, M. and Giridhar, K. (2014). Efficacy of sodium hypochlorite in controlling viral and bacterial diseases in muga silkworm, *Antheraea assamensis* Helfer. *Journal of Applied Biology & Biotechnology,* 2(02): 012-015.

Vijay, N. and Mech, D. (2020). Impact of improved muga culture training program on adoption level of the farmers. *Journal of Pharmacognosy and Phytochemistry,* 9(1): 2220-2224.

Vijay, N.; Shivananada, P.Y. and Mech, D. (2020). Influence of improved muga culture technology on knowledge level of farmer. *Journal of Pharmacognosy and Phytochemistry,* 9(1): 1954-1957.