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Research Article

COMPARATIVE STUDY OF MUGA COCOON YIELD IN IMPROVED AND TRADITIONAL PRACTICE

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Abstract: The study was undertaken to assess the muga cocoon yield through adoption of improved and traditional practice separately in seed and commercial crops at the farmers' level. The study revealed that average cocoon yield in both seed and commercial crops was higher in improved practice against the traditional practice of muga culture. In improved practices, average number of cocoon yield was found 47 and 42 per dfl against the cocoon yield of 31 and 20 per laying in traditional practice during Chatua (Feb-Mar) and Bhadia (Aug-Sep) seed crops 2014 respectively. Similarly, the average number of cocoon yield in both Chatua and Bhadia seed crops during 2015 was higher in improved practice (45 & 24) against the traditional practice (37 & 19) respectively. Likewise, average number of cocoon yield per dfl in Jethua (Apr-May) and Kotia (Oct-Nov) commercial crops during 2014 was higher in improved practice (62 & 58) against the cocoon yield per laying in traditional practice (49 & 43) respectively. Similarly, the average number of cocoon yield per dfl in both Jethua and Kotia commercial crops was higher in improved practice (65 & 52) against the cocoon yield per laying in traditional practice (47 & 43) respectively during 2015. The t-test conducted for equality of variance in ERR between traditional and improved practices found highly significant at 1 and 5 percent level in all the seed and commercial crops in both the years. Thus, the study revealed that improved practice was effective for higher cocoon yield against traditional practice of muga culture.

Keywords: *Muga culture, Traditional practice, Improved technology*

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Introduction

Muga culture an age-old traditional industry practiced for production of most costly silk called 'golden yellow muga silk'. It has immense potentiality for sustainable income generation among the rural folk and mainly practiced in Assam and few other states in north eastern region of India. With the congenial climate and plenty of nature grown food plants, the state Assam alone contributes more than ninety percent of the total production of muga silk in the country. Presently, more than 10,000 ha area is covered under cultivation of muga host plantation and about 34,000 families are actively involved with the muga culture in Assam. Production and productivity of muga culture is mostly depends on the knowledge and adoption of the latest technologies [6,13]. In the recent past, various improved technologies namely, maintenance of host plants through application of inputs, pruning schedule, pest and disease management, disinfection of rearing field before and after rearing of silkworm crops, disinfection of appliance, disease free layings (dfl), early stage rearing under nylon net, 'lahdoi' for control of muscardine diseases of silkworm and bamboo mountage for cocoon spinning *etc* were developed for enhancing production and productivity of muga. Besides, the technologies were disseminated to the farmers' field through various extension programmes by the extension workers of Govt departments and research institutes. However, production of muga raw silk is still behind the potential production of 200 MT and has been swinging from 105-158 MT during last 10 years [1]. It was reported that in muga culture, yield gap between demonstration centre and the farmers is 50% in seed and 30% in commercial crop [4]. Therefore, present study was undertaken to assess the cocoon yield through adoption of improved technologies at the farmers' level.

Materials and method

Present investigation was carried out in Golaghat district of Assam during 2014 and 2015. A group of 30 farmers who have adopted improved technologies through assistance provided from CMER&TI, Lahdoigarh was selected. A group of 30 farmers who have using traditional practice of muga culture was selected for comparative study purpose. An interview scheduled pertaining to use of improved technologies and traditional practices for seed and commercial muga crops was prepared and crop performance of seed and commercial crop was collected after completion of each crop. Statistical analysis was carried to assess the crop performances in traditional and improved practices. t-test was used to know the crop performance of seed and commercial crops between traditional and improved technology respectively.

Result and Discussion

Performances of muga silkworm seed and commercial crops in terms cocoon yield and ERR under traditional and improved practices are presented in [Table-1], it could observe that average cocoon yield per laying in Chatua and Bhadia seed crops during 2014 under traditional practice was 31 and 20 with the ERR of 28.48 % and 26.93 % respectively. Similarly, the average cocoon yield per laying in Chatua and Bhadia seed crops during 2015 under traditional practice was 37 and 19 with the ERR of 33.45 % and 26.51 % respectively. On the other hand, average cocoon yield per dfl (disease free laying) in Chatua and Bhadia seed crops during 2014 under improved practice was 47 and 42 with the ERR of 41.80 and 58.93 % respectively. Similarly, from the [Table-2] it was observed that average cocoon yield per laying in Chatua and Bhadia seed crops during 2015 under improved practice was 45 and 24 with the ERR of 40.53 % and 33.45 % respectively. Data presented in the [Table-3] revealed that average cocoon yield per laying in Jethua and Kotia commercial crops during 2014 was 49 and 43 with the ERR of 43.43% and 58.95% respectively. Similarly, the average cocoon yield per laying in Jethua and Kotia commercial during 2015 was 47 and 43 with the ERR of 42.21% and 60.40% respectively under traditional practice.

Table-1 *Average performance of muga seed crops in different seasons under traditional practice*

Crops seasons	No. of farmers	Layings brushed (Nos)	Fecundity (Nos)	Hat. (%)	Worms brushed (Nos)	Loss of worms due to incidence of pest (%)	Loss of worms due to incidence of diseases (%)	Other loss of worms (%)	Cocoon yield (Nos)	Cocoon yield per laying (Nos)	ERR (%)
Chatua Seed crop 2014	30	244	135	80	26352	18.5	32.0	21.0	7505	31	28.48
Bhadia Seed crop 2014	30	234	120	62	17410	16.6	33.8	22.7	4689	20	26.93
Chatua Seed crop 2015	30	212	140	80	23744	16.5	36.5	13.6	7942	37	33.45
Bhadia Seed crop 2015	30	206	122	60	15079	15.0	29.8	28.7	3997	19	26.51

Table-2 *Average performance of muga seed crops in different seasons under improved practice*

Crops seasons	No. of farmers	Layings brushed (Nos)	Fecundity (Nos)	Hat. (%)	Worms brushed (Nos)	Loss of worms due to incidence of pest (%)	Loss of worms due to incidence of diseases (%)	Other loss of worms (%)	Cocoon yield (Nos)	Cocoon yield per dfl (Nos)	ERR (%)
Chatua Seed crop 2014	30	250	140	80	28000	14.0	22.8	21.4	11704	47	41.80
Bhadia Seed crop 2014	30	233	120	60	16776	11.4	13.2	16.5	9886	42	58.93
Chatua Seed crop 2015	30	230	140	80	25760	12.0	26.5	21.0	10441	45	40.53
Bhadia Seed crop 2015	30	221	120	60	15912	14.6	28.0	24.0	5323	24	33.45

Table-3 *Average performance of muga commercial crop in different seasons under traditional practice*

Crops seasons	No. of farmers	Layings brushed (Nos)	Fecundity (Nos)	Hat. (%)	Worms brushed (Nos)	Loss of worms due to incidence of pest (%)	Loss of worms due to incidence of diseases (%)	Other loss of worms (%)	Cocoon yield (Nos)	Cocoon yield per laying	ERR (%)
Jethuacom. crop 2014	30	312	140	80	34981	15.5	19.7	21.4	15172	49	43.4
Kotiacom.crop 2014	30	257	120	60	18504	10.7	12.8	17.6	10940	43	58.9
Jethua com. crop 2015	30	225	140	80	25237	14.5	24.7	18.6	10763	47	42.2
Kotia com.crop 2015	30	244	120	60.0	17592	11.0	10.0	18.2	10757	43	60.4

Table-4 *Average performance of muga commercial crops in different seasons under improved practice*

Crops seasons	No. of farmers	Layings brushed (Nos)	Fecundity (Nos)	Hat. (%)	Worms brushed (Nos)	Loss of worms due to incidence of pest (%)	Loss of worms due to incidence of diseases (%)	Other loss of worms (%)	Cocoon yield (Nos)	Cocoon yield per dfl (Nos)	ERR (%)
Jethua com. crop 2014	30	325	140	80	36400	8.6	15.8	20.3	20099	62	55.3
Kotia com.crop 2014	30	279	140	60	23464	7.2	5.5	18.4	16160	58	68.9
Jethua com. crop 2015	30	309	140	80	34571	8.8	14.8	18.1	20072	65	58.2
Kotia com.crop 2015	30	278	140	60	23338	8.3	11.3	17.9	14333	52	62.4

Table-5 *Summarization oft- Test result on ERR of Seed crops under traditional and improved practice*

Crops seasons	t-test				
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Chatua Seed2014	-5.419	58	0.0008**	-13.32333	2.45880
Bhodia Seed2014	-12.140	58	0.0003**	-32.00333	2.63614
Chatua Seed2015	-2.501	58	0.0152**	-7.08333	2.83272
Bhodia Seed2015	-13.835	58	0.0009**	-37.42000	2.70479
Chatua Seed Pooled	-4.975	58	0.0002**	-10.20067	2.05024
Bhodia Seed Pooled	-16.861	58	0.0004**	-34.70667	2.05835

** Significant at 1% level

Table-6 *Summarization of t- Test result on ERR of Commercial crops under traditional and improved practice*

Crops seasons	t-test				
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Jethua Com. 2014	-4.644	58	0.0006**	-11.85333	2.55222
Kotia Com. 2014	-3.459	58	0.001**	-9.97333	2.88366
Jethua Com.2015	-7.227	58	0.0006**	-15.98667	2.21210
Kotia Com. 2015	-.726	58	0.0471*	-1.98667	2.73736
Jethua Com. Pooled	-8.210	58	0.0009**	-13.92300	1.69581
Kotia Com. Pooled	-2.896	58	0.0056**	-5.98233	2.06563

** Significant at 1% level

From the [Table-4], it can be seen that average cocoon yield per dfl in Jethua and Kotia commercial crops during 2015 was 62 and 58 with the ERR of 55.28 % and 68.92% respectively. Similarly, the average cocoon yield per dfl in Jethua and Kotia commercial during 2015 was 65 and 52 with the ERR of 58.20 % and 62.39 % respectively under improved practice. The t- test used for equality of population means for improved and traditional practices. t-test used for both seed crops and commercial crops on ERR %, it was observed that from the [Table-5], in the seed crops, the ERR% between traditional and improved practices was highly significant at 1 % level of significance. Similarly, in commercial crops, the ERR%, between traditional and improved practices are highly significant at 1 % level of significance [Table-6]. Muga silkworms are reared in outdoor condition and many of the times the silkworms are exposed to adverse environmental factors like high temperature, storms, rain, *etc*. Besides, various seasonal pest and predators assault the silkworm during its rearing. Further, the muga silkworms are highly susceptible to various diseases caused by bacterial, viral and protozoan pathogens. The improved practices of maintenance of muga host plants through application inputs, pruning of plants according to crop schedule, control of pest and disease, *etc* are effective for production of quality leaf to rear silkworm. Disinfection of rearing field with the mixture of lime and bleaching powder and spray of potassium hypochlorite before brushing of silkworm, reduced intensity of silkworm diseases during its rearing. Disease free layings (dfl) produced through examination of mother moths and surface sterilization of egg is one of the improved practices of muga culture and highly effective for better crop performance. Lahdoi was used to control muscardine disease of silkworm.

In case of traditional practice, the farmers never maintained the host plants. Non-application of inputs to the host plants and non-attending pruning of plants resulted production of inferior quality of leaf unsuitable for rearing of silkworm. In case of traditional methods, the farmers used to brush the silkworm in a crude method *i.e.,* never used examination of mother moth as well as surface sterilization of eggs. Besides, the farmers never used disinfection of field before and after rearing. Nylon nets could not be used to protect the silkworm from pest and predators due to tallness of plants as they never used to prune the plants. Thus, loss of silkworm due to incidences of pest and diseases was found to be higher in traditional practice against the improved practice. From the [Table-1], it was observed that loss of worms was recorded 15.0 to 18.5 percent due to incidence of pest and 29.8 to 36.5 percent due to incidence of diseases during seed crop rearing. On the other hand, loss of silkworm due to incidence of pest (11.4 to 14.6 percent) and diseases (13.2 to 28.0 percent) was found to be less in improved practices [Table-2] Hence, the ERR during seed crops was found to be higher in improved practices against the traditional practices of muga culture. In the same way, from the [Table-2], it was observed that loss of worms was recorded 10.7 to 15.5 percent due to incidence of pest and 10.0 to 24.7 percent due to incidence of diseases during commercial crops of rearing. On the other hand, loss of silkworm due to incidence of pest (7.2 to 8.8 percent) and diseases (5.5 to 15.8 percent) was found to be less in improved practices [Table-2]. Hence, the ERR during commercial crops was found better in improved practices against the traditional practices during commercial crops. Similar trends of cocoon production under improved practices of muga culture was also reported by various authors [2-13].

Conclusion

The present study revealed that improved technologies of muga culture was effective for cocoon yield in both seed and commercial crops when compared to traditional practices in which the farmers don't maintenance the host plant and other prophylactic measures for control of disease and pest of silkworms. Thus, from the study, it can be concluded that adoption of improved technologies will increase the cocoon yield in both seed and commercial crops.

Application of research: Information of the study will help for sustainable development of muga culture through adoption of improved technologies

Research category: Sericulture Extension

Abbreviations: dfl : disease free layings

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Study area / Sample Collection: Golaghat district of Assam

Cultivar / Variety name: Chatua and Bhadia seed crops

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