Original Research Article

PROBLEMS AND REFORMS OF SERICULTURE SEED FARMERS IN MALDA DISTRICT, WEST BENGAL

Comment [SAB1]: Status of sericulture seed farmers in Malda District of WB

Abstract:
Being an agro based industry; sericulture provides employment opportunities to men and women in rural as well as urban areas. Adopted Seed Rearers (ASRs) are the sericulture farmers having impeccable skills involved in the production of quality mulberry seed cocoons, which are used for the generation of healthy commercial Disease Free Layings (DFLs). In this study, the primary data was collected from the leading ASRs of Gazole, Malda district, West Bengal. The study has revealed that the ASRs are facing several constraints to generate superior quality seed cocoons. Women in the family are also actively engaged in all activities of sericulture generates considerable income. Hence sericulture can be considered as a promising tool for the sustainable rural development.

Keywords: Sericulture, Adopted seed rearers, Disease Free Layings, Seed cocoons , West Bengal

Introduction:

ASRs are the backbone of sericulture industry; they generate quality seed cocoons which are used for the production of commercial DFLs. The ASRs of Malda district, West Bengal are facing several problems to generate quality multivoltine seed cocoons especially during unfavourable seasons. Success of P1 (Parental seed) crop depends on numerous factors such as availability of quality of mulberry leaves, maintenance of optimum temperature and humidity inside rearing room, following proper disease management practices etc. In addition to that, sericulture is labour intensive, especially manpower is required for leaf harvesting, chopping of leaves for young silkworm larvae, washing of dala, cleaning of bed, disinfection of rearing room etc. Hence, active participation of women other family members is very much essential in all downstream activities of sericulture. The present study is to understand the constraints facing by the ASRs of Malda district, so that appropriate measures can be taken to increase the productivity of the ASRs and make them capable for generating higher income.

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Review of literature:

Mulberry silkworm are completely domesticated, hence a separate rearing room facing East-West direction with adequate ventilation is needed for rearing of silkworm. Silkworm larvae are so delicate and highly sensitive to the outside temperature and humidity, therefore maintenance of optimum temperature and humidity inside rearing room is a prerequisite (Ueda et al.,1962, Vijaya Kumari et al., 2001). Young age larvae prefer a temperature of 25^{0}C to 28 ^{0}C and relative humidity (RH) of 80-90% where as late age larvae prefer a temperature of 24 ^{0}C -25 ^{0}C and RH of 65 -75% (Kumar et al., 2001). In West Bengal, temperature drops to 10-15 ^{0}C during winter, hence room heaters or electric bulbs are used to maintain optimum temperature inside the rearing room. Silkworms are highly susceptible to various diseases, outbreak of grasserie, flacherie, and gattine are common during unfavourable seasons like Jaista, Shravani and Bhaduri which may often lead crop loss (Deb et al., 2015, Hossain et al., 2017). Incidence of diseases can be controlled by applying disinfectants at proper dosage. Sericulture activities demands huge labour involvement, around 50% of work in mulberry cultivation and 60% of work in silkworm rearing is done by women (Kasi et al., 2013, Sarkar et al., 2018). Sericulture offers a reliable source

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income for women in rural India their by helps to achieve economic independence and also a higher socio-economic status in the society. In West Bengal, sericulture is practised 5 times in a year, hence it is capable of generating more income compare to other traditional cash crops (Trivedi et al., 2015).

Materials and methods:

A structured questionnaire was given to the leading ASRs (15 No.s) of Gazole, Malda district, WB involved in the generation of multivoltine seed cocoons to access facilities of rearing house, rearing appliances, knowledge of disinfection procedures, income generation of the family etc. The primary data collected with help of a senior technical assistant.

Results and discussion:

Sericulture is a traditional practice in West Bengal. About 33 % of ASRs in Gazole, Malda district are involved in sericulture activities for more than 25 years and 40 % ASRs are involved in sericulture activities for 20-25 years where as 27% ARS are involved in sericulture activities for less than 20 years (Table no.1). Quantity of seed cocoons produced is directly related to the capacity of brushing of DFLs, which is based on availability of optimum quantity of mulberry leaves and infrastructure of rearing room. 33% of ASRs are capable of rearing more than 400 DFLs in favourable seasons where as 54 % are rearing 300-400 DFLs and 13 % are rearing less than 300 DFLs (Table no.1). All leading ASRs are practicing sericulture in both favourable and unfavourable seasons. Average production of seed cocoons is higher in favourable seasons than in unfavourable seasons. Outbreak of diseases especially during late-age rearing is common phenomenon in unfavourable seasons. Usage of bed disinfectant and room disinfectant is very much essential for controlling incidence of diseases. All the ASRs are using bed and room disinfectant, however only 33 % of ASRs are having proper knowledge about the disinfectant dosage (Table no.1).

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Table no.1. Showing percentage of ASRs involved in sericulture activities in years, capacity of DFLs brushing, involvement of family members and generation of annual income through sericulture.

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SN	Details of ASRs	Percentage of ASRs
1	**Years involved in sericulture**	
	More than 25 years	33
	Between 20-25 years	40
	Less than 20 years	27
2	**Capacity of brushing DFLs**	
	More than 400 DFLs	33
	Between 300-400 DFLs	54
	Less than 300 DFLs	13
3	**Family members involved in sericulture**	
	More than 5 members	27
	4-5 members	47
	less than 4 members	26
4	**Annual income generated through sericulture**	

	More than Rs.80000	20
	Between Rs.60000-80000	53
	Less than Rs.60000	27

Northern part of West Bengal experience wide range of climatic fluctuations. Maintenance of optimum temperature and humidity during rearing is a critical factor for the proper development of silkworm larvae. During summer temperature cross more than 35 ^{0}C where as in winter temperature drops to 10 ^{0}C. Nevertheless high humidity is also a key issue in P1 Bhaduri and P1 Agrahayani seasons, hence dry and wet thermometer is essential to check temperature and humidity inside the rearing room. Around 67% of ASRs do not have a properly working thermometer (Table No.2). Hence temperature and humidity is not properly measured. None of the ASRs are having electric room heater , which is very much essential during winter. Temperature inside rearing room is maintained with the help of electric bulbs. 16 hours light period and 8 hours dark period is advisable for proper development of silkworm larvae. Since electric bulbs are used throughout the night to regulate temperature in winter, maintenance of 8 hours dark period is difficult**,** which may adversely affect the larval growth. None of the ASRs are using plastic collapsible mountages. All ASRs are using Bamboo chandrike during spinning of larvae, which are difficult for maintenance and disinfection, moreover meltage percentage of cocoons are higher compare to plastic collapsible mountages. Around 53% of ASRs do not have sufficient number of mountages (Table No.2).

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Table no. 2: showing various details of rearing appliances inside rearing room of ASRs, participation of women in the family and interest of future generation to continue sericulture.

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SN	Details of ASRs	Percentage of ASRs	
		Yes	No
1	Practising sericulture in both favourable and unfavourable seasons	100	0
2	Dry and wet thermometer in working condition	33	67
3	Use of room disinfectant	100	0
4	Use of bed disinfectant	100	0
5	Knowledge about proper dosage of disinfectants	33	67
6	Use of electric room heaters in winter	0	100
7	Use of electric bulb for maintenance of temperature	100	0
8	Use of plastic collapsible mountages	0	100
9	Shortage of mountage (bamboo chandrike)	53	47

10	Participation of women in the family	100	0
11	Interest of young generation in the family to continue sericulture in future	100	0

Sericulture demands labour for pruning of mulberry garden, leaf plucking and chopping, disinfection of rearing room and appliances, cocoon harvesting and deflossing etc. Most of these works are done by women or children in the family irrespective of age. This study revealed that around 27% ASRs are having more than 5 family members involved in sericulture activities, 47 % of ASRs are having 4-5 members whereas 26% of ASRs are having less than 4 members in the family involved sericulture (Table no.1). Most of the cash crops are practiced twice in a year but sericulture is practised five times in a year hence the annual income is high compare to other cash crops. 20% of ASRs are earning more than Rs.80,000 per annum, 53% of ASRs are earns between Rs.60,000-80,000 per year, 27% earns less than Rs. 60000 annually (Table no.1). Migration of youth from village to urban in search of better remuneration has affected sericulture industry in many areas. However young generation in the family of ASRs has informed that they are earning considerable income through sericulture, therefore they are interested to continue sericulture in future (Table No.2).

Conclusion

ASRs in Malda, West Bengal are practising sericulture for several years. Quality of the seed cocoon is largely depends on the rearing practises. This study has revealed that several constraints of ASRs for producing quality seed cocoons. Women in the family are actively participating in all sericulture activities and are satisfied with their income generation through sericulture. However, periodic awareness programme and extension activities has to be conducted to make them adopt latest technologies and mechanization in the field of sericulture, so that in long term ASRs can generate more profit, improve their standard of living and can contribute to a sustainable rural development .

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1. Chatterjee M, Ray N. Studies on rearing performances of mulberry silkworm (Bombyx mori Linnaeus, 1758) in hooghly district of West Bengal (India): A newly explored area. Acta Fytotechnica et Zootechnica. 2020 Jun 18;23(2).

2. Deb, S., Chakraborty, S., Hazra, N., Saha, A. and Chakraborty , C. Impact of temperature and relative humidity on incidence of Grasserie in Silkworm Bombyx Mori in West Bengal. Journal Of Plant Protection And Environment , 2015. 12(1): 19-25.

3. Hanafi YS, Mohammad T, Hoque A. Determinants of sericulture in Malda district, West Bengal: A geographical analysis. The Geographer. 2019;66(2):74-84.

4. Hossain Z, Chakraborty S, Gupta SK, Saha AK, Bindroo BB. Silkworm disease incidence trends during the years 1992–2011 in the Murshidabad district of West Bengal, India. International Journal of Tropical Insect Science. 2017 Dec;37(4):259-70.

5. Kaviraj M, Kumar U, Chatterjee SN, Swain SL, Singh M, Nandi K. Comparative performance analysis of mulberry silkworm (Bombyx mori L.) races for integration of superior yield and maximize profit in West Bengal. bioRxiv. 2021 Jan 1.

6. Kumar NS, Yamamoto T, Basavaraja HK, Datta RK. Studies on the Effect of High Temperature on Fl Hybrids Between Polyvoltine and Bivoltine Silkworm Races of Bombyx mori L. International Journal of Industrial Entomology. 2001;2(2):123-7.

7. Kumari KM, Rajan RK, Himantharaj MT, Nataraj B, Rekha M. Influence of Temperature and Relative Humidity on the Rearing Performance and Disease Incidence in CSR Hybrid Silkworms, Bombyx mori L. International Journal of Industrial Entomology. 2001;3(2):113-6.

8. Sarkar K, Majumdar M, Ghosh A. Critical analysis on role of women in sericulture industry. Economic Affairs. 2018;63(1):209-21.

9. Trivedi S, Sarkar K. Comparative study on income generation through agriculture crop and sericulture at farmer's level in Murshidabad district. Journal of Entomology and zoology Studies. 2015;3(1):242-5.

10. Ueda S, Lizuka H. Studies on the effects of rearing temperature affecting the health of silkworm larvae and upon the quality of cocoons-1 Effect of temperature in each instar. Acta Sericologia in Japanese. 1962;41:6-21.
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