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Impact of Improved Package of Practices on Productivity of Mulberry Leaf and Cocoon Plantation of S 1635 Mulberry Variety with New in Murshidabad District

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Abstract

Demonstration of technology assessment and refinement (TAR) program at farmers field of Murshidabad district was done during 2002 to 2006 with a view to minimize the productivity gap of mulberry leaf and cocoon at farmers' level. Demonstration with improved technology package increased the leaf and cocoon yield under new plantation of S1635 (with 0.6 × 0.6 m spacing) by 11.97 and 18.35% respectively at farmer's field. The package used in the trials was found to be valid and advantageous and as such recommended for large-scale popularization at field level.

Key words : Technology assessment and refinement (TAR), Wider spacing, Improved mulberry variety, Leaf and cocoon productivity.

Sericulture is an agro-based economic enterprise generating self-employment and income to the large rural masses, specially the resource poor farmers and become sustainable year after year due to its low investment with higher long-term returns and minimum gestation period. With the advancement of technology during past two decades, sericulture industry has transformed from its traditional status to a commercial venture and India has emerged as the second largest silk producing country in the world next to China. Presently, the contribution of eastern and north-eastern states to the total annual raw silk production of India is more than 18% and West Bengal occupied third among the silk producing states in the country. West Bengal sericulture is characterized by widely fluctuating climatic condition with severe winter, extremely hot and humid, and hot and dry summer as well. These climatic factors restrict the farmers from rearing of improved silkworm breeds/ hybrids with high productivity (40—45 kg/100 dfls) and force them to rear hardy multivoltine Nistari having low yield potential (15—20 kg/100 dfls). Lakshmanan et al. (1, 2) reported that among the agro-based rural industries, sericulture is one of the labor intensive and income-assuring occupation. The sustainable growth of sericulture becomes crucial, as climate is not congenial to this region for harvesting successful cocoon crops round the year at farmers' field. The poor farmers become more reluctant in adopting improved technologies due to uncertainty in successful farming. Effective transfer of technology is a prerequisite to realize its full potentialities at users' level. Several technologies pertaining to mulberry sericulture have been developed by the Central Sericultural Research and Training Institute, Berhampore (WB) and were disseminated to the farmers. In spite of such committed efforts, there exists a notable gap between the actual yield obtained by the farmers and its production potential. In fact farmers adopted the technologies without knowing the technologies properly. To reduce this gap, the institute decided to launch a technology assessment and refinement program with a view to disseminate the integrated package incorporating all the recently developed technologies at the farmers' field so that farmers could get the opportunity of taking the advantage of improved package through its adoption. Therefore, a special drive was initiated during November 2002 to disseminate the improved package of practices in the farmers' field with raising new plantations of S1635 under 0.6 × 0.6 m spacing. The main objective of the program was to test the validity of the technology package at farmers' field and also to demonstrate and establish the benefit of improved package over conventional prac-

Table 1. Effect of improved package on leaf yield in newly raised S1635 mulberry garden. *Significant at 5% level, NS-Not Significant. Period 2002 to 2006, No. of farmers 50, No. of villages 10.

Name of the crop	Package	Average leaf yield (kg/ha/crop)	*t* value	Gain over control (%)
		7109		
	Control	6705	NS	06.01
Feb	TAR	7184	8.48*	19.19
	Control	6028		
Apr	TAR	7721	5.57*	13.19
	Control	6821		
Jun-Jul	TAR	7456	6.02*	11.40
	Control	6693		
Sep	TAR	6343	6.59*	10.07
	Control	5763		
			Over all	11.97

tice through conducting large-scale trials with the participating farmers.

Methods

Technology assessment and refinement (TAR) program was implemented in the farmers' field of Murshidabad district of West Bengal with raising new plantation of S1635—a high yielding mulberry variety. A total of 50 farmers were selected from 10 villages covering 3.33 ha of land for raising of new plantation of S1635 mulberry variety with 0.6 × o.6 m spacing. The farmers were selected in consultation with Directorate of Sericulture (DOS), West Bengal. The main tool was method and result demonstration in participating farmers' field and demonstration was conducted continuously for three years for an individual farmers. The program was implemented for 5 years (2002—2006) in all the 5 commercial crop season of West Bengal, namely November (Agrahayani), February (Chaitra), April (Baisakhi), June-July (Shravani) and September (Aswina). Though the Central Sericultural Research and Training Institute, Berhampore, WB, National Silkworm Seed Organization (NSSO) and DOS were the implementing agency, the Research Extension Center, Nabagram, looked after the day-to-day activities.

The package includes all the newly evolved technologies and products of this Institute that was tested in all commercial crops seasons at selected farmers' plot, as given below.

Mulberry cultivation : Raising of improved mulberry variety S1635, Spacing 0.6 × 0.6 m, Pruning—bottom pruning, FYM—20 m/ha/per year, Biofertilizer—Nitrofert 20 kg/ha/per year in equal split doses and phosphofert 75 kg/ha once in 4 years, Digging and weeding based on standard schedule, Pest and disease control measure, PGR 0.01% after 15 days and 30 days of pruning, Reduced dose of chemical fertilizer : N : P: K 168:30:112 kg/ha/ per yr in five split doses (15 days after application of biofertilizer), Irrigation at an interval of 15 days from November to May, Leaf harvesting—Morning or evening of the day, and Integrated pest and disease management. Silkworm rearing : Multi × bi hybrids in November, February and April seasons, and Multi × multi in June-July and September seasons, Disinfection of rearing house and its surrounding with 5% bleaching powder solution before and after each crop season, Incubation of silkworm eggs under controlled environmental conditions (25 C temperature and 80% RH), Chawki rearing (box rearing method/open type method), Moulting care—using lime, Late-age rearing with recommended bed spacing (396 sq ft/100 dfls), Prevention and control of diseases and pest (use of recommended dose of bed disinfectant—labex 4 kg/100 dfls and 2% bleaching powder solution for Uzi control), Use of bamboo / plastic mountage with recommended larval density (50—60 larvae/sq ft) and placement of the chandraki in varanda or any shady place, and Cocoon harvesting 5—6 days after spinning. Control : The traditional practice of farmers, comprising of the following, were treated as control : S1635 mulberry variety in existing garden under close spacing, Application on NPK 336 : 180 : 112 kg/ha per year in five equal split dose, Multi × multi/multi × bi combinations were used in rearing, Labex, a silkworm bed disinfectant, was also applied without its proper dose. Late-age rearing with 225 sq ft/100 dfls bed spacing, Irrigation based requirement from November to May (usually 4—6 in numbers), and Leaf harvesting—Morning or evening of the day.

The hybrid dfls were supplied from CSR & TI, Berhampore and Zonal Silkworm Seed Organization (ZSSO), Malda. Crop wise data were collected and statistically analyzed.

Results and Discussion

The productivity of mulberry leaf under newly

Table 2. Effect of improved package on cocoon yield. *Significant at 5% level. TAR indicate comprehensive package shown in treatment and control indicate traditional package practiced by the farmers shown as control.

Crop	Package	Total dfls (no.)	Hybrid	Cocoon yield 100 dfls (kg)	*t* value	Gain over control (%)	Over all
Nov	TAR	3000	N × NB4D2	51.95	5.432*	21.52	17.47
	Control	2500	N × NB4D2	42.75			
Feb	TAR	5000	N × NB4D2	42.87	5.169*	16.02	
	Control	3500	N × NB4D2	36.95			
Apr	TAR	4000	N × NB4D2	39.58	3.461*	14.89	
	Control	2500	N × NB4D2	34.45			
Jun-Jul	TAR	4500	N × M12(W)	31.21	8.505*	19.47	19.66
	Control	3500	Nistari	26.12			
Sep	TAR	4000	N × M12(W)	30.12	6.359*	19.86	
	Control	2200	Nistari	25.13			
					Over all	18.35	

raised plantation of S1635 and cocoons reared with the harvested leaves has been presented in Tables 1 and 2.

Leaf Yield

Data revealed that with the improved package of mulberry cultivation significant improvement in leaf yield over control was observed in all the seasons which signifies the impact of integrated package on productivity of mulberry leaf. Highest leaf yield was recorded during April crop (7,721 kg/ha) followed by followed by June-July crop (7,456 kg/ha). The reason of higher leaf yield may be the effect of improved package especially the wider (0.6 × 0.6 m) spacing. The gain in leaf yield over control was recorded highest during February (19.19%) followed by April (13.19%) while it was lowest during November (6.01%) (Table 1). The earlier studies made by Singh (3) in potato and Setua et al. (4) in mulberry cultivation corroborate the finfings of the present study.

Cocoon Yield

The cocoon yield data revealed that significant improvement in cocoon yield in all the five cemmercial crops using the leaves of newly raised plantation of S1635 (Table 2) was recorded though seasonal variations in cocoon yield were observed. This may be the impact of improved package (Fig. 1). Highest cocoon yield was obtained during November (51.95 kg per 100 dfls) with improved package. Over all gain in cocoon yield was found to be 18.35% over control. An average gain of 17.48 and 19.66% in cocoon yield over control was recorded in multi × bi and multi × multi combinations respectively. This gain in cocoon yield over traditional package was possible as comparatively the integrated package was proved to be more useful and had higher production potential. Similar observation was made by Setua et al. (4).

Economics

In the integrated package on an average Rs 743 and Rs 503 were recorded as an additional income/ gain by the rearing of 100 dfls of multi × bi and multi × multi combination respectively.

Though sericulture industry flourished and in the recent past recorded a steady growth, but progress in terms of productivity is not so encouraging. High

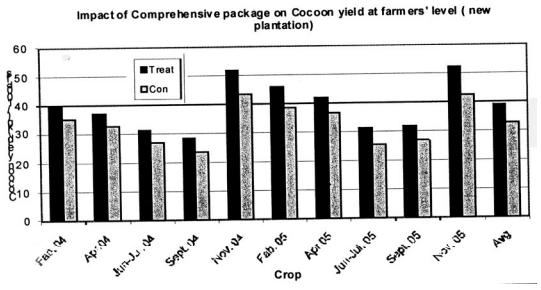

Figure 1. Crop-wise cocoon yield at farmers' level.

population growth had been rendering an increased pressure on land, resulting in limitation in horizontal growth of sericulture in future (1). Hence, the vertical growth of the industry remains the only alternative for exploiting the productivity potentials of the country. Through large-scale transfer of integrated package to the farmers' field following participatory approach the average productivity of mulberry leaf and cocoon increased considerably. The brushing capacity of dfls from the unit area of land of the farmers could also be increased and in turn, cocoon production. The integrated package disseminated has been found to be valid and has great potential for the sustainable growth of mulberry sericulture and therefore, it may be considered for large scale popularization in the plains of West Bengal and other parts of the country.

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