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Comparative economics of improved rearing package for new silkworm hybrids

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Abstract: The quantum of food, rearing bed area required/40,000 larvae of two new races *viz.* CSR2 x CSR5 and BL24 x NB4D2 were evaluated and an improved rearing package was prepared. Field trials were conducted to evaluate the adaptability of the package. Results revealed that by giving 20% more food and bed area the cocoon yield could be increased by 5-7 kg/40,000 larvae in both the races. Comparative economics of the present and improved rearing packages also showed a net gain of Rs. 1233.45/- and Rs. 649.75/- for 40,000 larvae of CSR2 x CSR5 and BL24 x NB4D2 respectively.

Key words : Rearing package, Silkworm breeds, Partial budgeting.

Introduction

In India, sericulture is mainly multivoltine oriented because of their high disease resistant nature and temperature tolerance. But their cocoon yield and quality are clearly lower than the bivoltine races (Datta, 1992). To solve these twin problems of low productivity and poor cocoon quality, farmers have to switch over to newer multivoltine and bivoltine hybrid rearing. With this aim, the Central Sericultural Research and Training Institute, Mysore has evolved newer multivoltine and bivoltine hybrids. To attain the object of a rational management of silkworm rearing and getting a good cocoon crop of superior cocoons, the formulation of rearing standard is essential (Kuribayashi *et al.* 1978). The main difference between the old and new races lies in their food utilisation efficiency (Kuribayashi *et al.* 1990). Yamamoto and Fujimaki (1982) and Anantharaman *et al.* (1993) had also reported the relative growth rate influenced by the amount of food consumed. Improved growth rate among newer races also necessitates increase in rearing bed area. Haque *et al.* (1992) and Roychoudhury *et al.* (1992) had proved that wider bed spacing plays a positive and significant role in improving growth and rearing parameters. Hence, the present study was carried out to standardise the food and space requirement for two newly evolved breeds *viz.* CSR2 x CSR5 and BL24 x NB4D2 and to formulate a new rearing package.

Materials and Methods

A study was carried out at Central Sericultural Research and Training Institute/ Mysore to evaluate the amount of food and the rearing bed area required for two newly evolved hybrids *viz.* CSR2 x CSR5 (bivoltine) and BL24 x NB4D2 (multivoltine) during three different seasons (1996-97). The present recommendtion for rearing bivoltine hybrids with 1200 kg leaves in 480 sq.ft rearing bed area/ 40,000 larvae was compared with 1000 kg leaves and 360 sq.ft bed area for cross breeds (Krishnaswamy, 1990). Earlier laboratory studies revealed that, both the hybrids performed well with 20% excess food and bed area and their cocoon yield and quality were significantly improved (Meenal *et al.* 2000, 2001). The above results were field tested to evaluate their adaptability on large scale at farmers' level during three different seasons (1997-98). Ten farmers each for bivoltine and multivoltine rearing were selected from two taluks *viz.* Srirangapatana and Nagamangala in Mandys district of Karnataka State, respectively. Fifty dfls, (20,000 larvae) each were reared for control (standared rearing package) and treatment (improved package) group. Partial budgeting was done to estimate the additional costs and returns/ 40,000 larvae and the incremental cost benefit ratio involved in adopting the new package was worked out (Johl and Kapur, 1973).

Table 1. Comparative rearing parameters for standard rearing vs improved method

Race	Treatment	Yield/100 dfls (kg)	Cocoon wt (g)	Shell wt. (g)	Shell ratio %	Rate/kg (Rs.)
CSR2 x CSR5	Improved method of rearing (1400 kg leaf, 575 sq.ft. bed area)	69.32	1.841	0.431	23.40	206.90
	Standard rearing (1200 kg leaf, 480 sq.ft. area)	63.54	1.801	0.408	22.65	192.90
BL24 x NB4D2	Improved method of rearing (1200 kg leaf, 430 sq.ft. bed area)	67.38	1.772	0.341	19.24	163.11
	Standard rearing (1000 kg leaf, 360 sq.ft. area)	61.14	1.648	0.309	18.75	157.01

Table 2. Added costs for improved method of rearing

Particulars	Quantity*	Rate/Unit (Rs.)	Total (Rs.)
CSR2 x CSR5			
Leaf	200 kg	2.00	400.00
Labour	4 man days	80.00	320.00
Rearing tray**	10 No.	5.00	50.00
Cleaning net**	20 No.	1.60	32.00
Bed disinfectant	1 kg	50.00	50.00
Total			852.00
BL24 x NB4D2			
Leaf	200 kg	2.00	400.00
Labour	3 man days	80.00	240.00
Rearing tray**	8 No.	5.00	40.00
Cleaning net**	16 No.	1.60	26.00
Bed disinfectant	700 g	50.00	35.00
Total			741.00

* - Quantity required in excess to the present package.

** - Worked out on the basis of depreciation cost of the assets

Results and Discussion

The data obtained from all the ten farmers were compiled and the mean values are presented in Table 1.

Rearing parameters

The results revealed that rearing the new hybrids with 20% excess food and bed area yielded 5-7 kg cocoons more than the control group. The quality of the cocoons was also improved resulting in an increase in single cocoon weight, shell weight and shell ratio (SR%) of both the races.

Economics

The details of partial budgeting are given in Tables 2-4. Added costs were calculated by considering the additional inputs used like

Table 3. Added returns from improved rearing method

Particulars	Yield / 40,000 larvae (kg)	Rate/Unit (Rs.)	Total (Rs.)
CSR2 x CSR5			
Treatment	69.32	206.90	14,342.30
Control	63.54	192.90	12,256.85
Added returns	5.78		2085.45
BL24 x NB4D2			
Treatment	67.38	163.11	10,990.35
Control	61.14	157.00	9,559.60
Added returns	6.24		1390.75

Table 4. Partial budget for standard rearing package vs improved rearing package (value/ 40,000 larvae)

Particulars (Rs.)	Race	
	CSR2 x CSR5	BL24x NB4D2
Added cost	852.00	741.00
Added returns	2085.45	1390.75
Net gain	1233.45	649.75
Increment cost Benefit ratio (ICB)	1:2.44	1:1.88

leaf, labour and rearing equipments. Two hundred kilogram of extra leaves, four extra man days and one kilogram of additional bed disinfectant were required for rearing 40,000 bivoltine hybrid larvae as per the improved package. In the same way, 200 kg leaves, three man days and 700 g of bed disinfectant were required in addition to the regular requirement for rearing multivoltine hybrids. Further, ten rearing trays (round bamboo tray of 3.5' dia) and 20 nylon bed cleaning nets were required for bivoltine hybrid rearing whereas, eight trays and 16 nets were required for multivoltine hybrids. The additional cost on rearing equipment were worked out on the basis of depreciation cost of the asset. Results revealed that an additional cost of Rs.852/- and Rs.741/- for bivoltine and multivoltine hybrids respectively were required for a farmer to practice the new improved package which yielded an additional return of Rs.2085.45/- and Rs.1390.75/ 40,000 larvae of CSR2 x CSR5 and BL24 x NB4D2 respectively. The data further revealed that by adopting the improved package one can achieve a net gain of Rs.1233.45 and Rs.649.75/ 40,000 larvae of bivoltine and multivoltine hybrids respectively. The incremental cost benefit ratio was 1:2.44 and 1:1.88 for CSR2 x CSR5 and BL24 x NB4D2 hybrids respectively. This clearly indicates that with the evolution of any new silkworm hybrid it is very much essential to standardise their rearing schedule specially the quantum of food and bed area required. This will enable us to improve the productivity of silk/ unit area of land.

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