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EVALUATION OF ECONOMICS OF SHOOT REARING TECHNOLOGY UNDER SUB-TROPICAL CONDITIONS- A PILOT STUDY

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ABSTRACT
Due to large scale urbanization of rural population it has been observed that there is shortage of manpower and increasing wages lead to higher cost of cultivation of agriculture and sericulture as well. To minimize the cost of cocoon production this study has been undertaken.
KEY WORDS: ***Commercializing Shoot Rearing, Sub-Tropical Conditions. Individual leaf plucking method, Silkworm.***

INTRODUCTION

The quality of mulberry leaf is one of the most important factors for the production of good cocoon crop (Ravi Kumar, 1988). The silkworm (*Bombyx mori* L) is a typical monophagous insect and mulberry is its sole food plant. The growth and development of silkworm larvae and the economic characters of cocoon are known to be influenced by the nutritional content of mulberry leaves (Krishnaswamy *et al.,* 1971, Machi and Katagiri, 1991; Singhal *et al.,* 2005). Impact of shoot rearing on commercial characters of cocoon comparing with plucked leaf feeding method has not been studied thereby evaluation of the feasibility of commercializing of shoot rearing under sub-tropical condition of Uttarakhand is envisaged.

MATERIALS & METHODS

Silkworm rearing was conducted during 02 common rearing seasons i.e. spring and autumn-2020. The silkworm hybrid was CSR2 x CSR4 during both the seasons and was obtained from NSS O, Bangalore. After successful chawki at Govt. Sericulture Farms, worms were distributed to selected farmers for late age rearing. 10 Farmers conducted rearing by adopting shoot rearing method and 10 farmers by traditional plucked leaf feeding method. Data were recorded on different rearing parameters and presented in Table 01 to 04: During spring season average intake of DFLs/farmer was 100 while as in autumn it was 50 DFLs/farmer, as per availability of quality leaf during respective seasons.

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RESULTS & DISCUSSIONS

Based on the performance of silkworm hybrids during spring and autumn seasons-2020 on different rearing parameters economics of shoot feeding vs. leaf feeding have been worked out.

Data obtained reveal that average number of man days utilized for 100 DFLS of shoot rearing was 25.60 in spring crop -2020, while as in tray rearing it was 51.20 and same way in autumn season the average man days utilized for shoot rearing of 100 DFLs was 25.20 while as in autumn-2020 it was 50.40. By adopting Shoot Rearing Technology farmers can save about 25 man days in rearing of 100 DFLs of silkworm bi-voltine hybrid,.

The cocoon production in autumn season was higher in comparison to spring-2020, was due to less supervision, as pandemic of COVID-19 lockdown hampered more in spring crop-2020, however its impact in autumn-2020 crop was also continued with.

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Table-1.Shoot rearing performance during spring crop -2020-

Sl. No.	Nameof the farmer/Parentage	Village/CRC	Source of DFLs	Name of the Hybrid	No. of DFLs Reared	Total Production				Yield/ 100 DFLds (kg)	Single cocoon wt. gm	Single Shell wt. gm	SR %	No. of man days utilized
						Reeling cocoons Kg	Double cocoons kg	Damage cocoons kg	Total Yield kg					
1-	Smt. Rekha W/O Ashok	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	36.500	1.200	1.300	39.000	39.000	1.64	0.34	20.73	25
2-	Km. Rani D/O Sultan	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	29.000	1.000	1.200	31.300	31.300	1.57	0.30	19.11	27
3-	Smt. Sushila W/O Suresh	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	27.900	1.000	0.400	29.300	29.300	1.48	0.29	19.59	26
4-	Smt. Guddi W/O Ranjit	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	39.600	1.600	0.300	41.500	41.500	1.51	0.31	20.53	24
5-	Smt. Sarita W/O Sita Ram	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	19.100	0.800	0.800	20.700	20.700	1.55	0.30	19.35	25
6-	Sri Manjit S/O Balbir	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	21.700	1.400	1.400	24.500	24.500	1.49	0.29	19.46	26
7-	Dharmpal S/O Prithvi	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	37.800	5.300	3.600	46.700	46.700	1.55	0.31	20.00	24
8-	Smt. Gallon W/O Kanwar Singh	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	25.200	1.800	1.000	28.000	28.000	1.56	0.31	19.87	26
9-	Smt. Bhadu W/O Ratan	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	31.800	2.400	1.600	35.800	35.800	1.61	0.32	19.88	27
10-	Sri Rajendra S/O Babu Ram	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	42.500	0.500	2.800	45.800	45.800	1.58	0.32	20.25	26
				Total	**1000**	**311.100**	**17.00**	**14.400**	**342.60**	**342.600**				**256**
				Avrage	**100**	**31.100**	**1.700**	**1.400**	**34.26**	**34.260**				**25.60**

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Table-2: Tray rearing performance during spring crop -2020-

Sl. No.	Nameof the farmer/Parentage	Village/CRC	Source of DFLs	Name of the Hybrid	No. of DFLs Reared	Total Production				Yield/ 100 DFLds (kg)	Single cocoon wt. gm	Single Shell wt. gm	SR (%)	No. of man days utilized in 50/100 DFLs
						Reeling cocoons (Kg)	Double cocoons (kg)	Damage cocoons (kg)	Total Yield kg					
1-	Smt. Premwati W/O Sekhar	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	23.600	0.700	1.000	25.300	25.300	1.56	0.30	19.23	25.00/50
2-	Sri Ramesh S/O Roop Ram	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	33.200	2.000	0.500	35.700	35.700	1.42	0.28	19.72	26.00/52
3-	Sri Prem Singh S/O Ramdeo	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	28.700	1.900	3.800	34.400	34.400	1.46	0.28	19.18	25.50/51
4-	Sri Balam S/O Phul Singh	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	48.900	0.800	0.500	50.200	50.200	1.68	0.34	20.24	25.00/50
5-	Sri Sadhu Ram S/O Chhote Lal	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	100	38.300	2.200	2.000	42.500	42.500	1.55	0.30	19.35	26.50/53
6-	Sri Ravindra S/O Khajan	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	26.200	1.400	1.500	29.100	29.100	1.45	0.27	18.62	25.50/51
7-	Sri Rinku S/O Palli	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	13.500	0.800	5.100	19.400	19.400	1.49	0.29	19.46	26.00/52
8-	Smt. Patti Devi W/O Milu	Sekhonwala	NSSO, Bangalore	CSR2 x CSR4	100	13.400	1.00	2.300	16.700	16.700	1.52	0.29	19.08	25.00/50
9-	Sri Yamin S/O Hamid	Sekhon wala	NSSO, Bangalore	CSR2 x CSR4	100	33.400	0.000	4.000	37.400	37.400	1.51	0.30	19.87	26.00/52
10-	Smt. Reena W/O Pawan	Sekhon wala	NSSO, Bangalore	CSR2 x CSR4	100	23.000	0.700	1.000	24.700	24.700	1.48	0.29	19.59	25.50/51
				Total	**1000**	**282.2**	**11.5**	**21.7**	**315.4**	**315.40**				**256/512**
				Average	**100**	**28.22**	**1.15**	**2.17**	**31.54**	**31.54**				**128/51.20**

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Table-3: Shoot rearing performance during autumn crop -2020-

Sl. No.	Nameof the farmer/Parentage	Village/ CRC	Source of DFLs	Name of the Hybrid	No. of DFLs Reared	Total Production				Yield/ 100 DFLds (kg)	Single cocoon wt. gm	Single Shell wt. gm	SR %	No. of man days utilized/100 DFLs of rearing
						Reeling cocoons Kg	Double cocoons kg	Damage cocoons kg	Total Yield kg					
1-	Smt. Rekha W/O Ashok	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	19.000	2.000	1.400	22.400	44.800	1.54	0.29	18.83	24
2-	Km. Rani D/O Sultan	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	21.800	1.400	0.900	24.100	48.200	1.40	0.27	19.28	26
3-	Smt. Sushila W/O Suresh	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	20.600	2.000	1.000	23.600	47.200	1.38	0.24	17.39	24
4-	Smt. Guddi W/O Ranjit	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	20.400	1.800	1.000	23.200	46.400	1.45	0.27	18.62	25
5-	Smt. Sarita W/O Sita Ram	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	19.500	1.500	0.300	21.300	42.600	1.46	0.28	19.18	26
6-	Sri Manjit S/O Balbir	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	20.600	1.300	1.000	22.900	45.800	1.39	0.24	17.27	27
7-	Dharmpal S/O Prithvi	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	18.500	1.900	1.200	21.600	43.200	1.45	0.26	17.93	25
8-	Smt. Gallon W/O Kanwar Singh	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	15.200	1.300	1.200	17.700	35.400	1.42	0.28	19.72	26
9-	Smt. Bhadu W/O Ratan	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	14.500	1.500	1.200	17.200	34.400	1.50	0.29	19.33	24
10-	Sri Rajendra S/O Babu Ram	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	20.500	0.500	0.200	21.200	42.400	1.48	0.29	19.59	25
				Total	**500**	**190.600**	**15.200**	**08.41**	**215.200**	**430.400**				**252.00**
				Average	**50**	**19.060**	**1.500**	**0.841**	**21.520**	**43.040**				**25.20**

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Table-4: Tray rearing performance during autumn crop -2020.

Sl. No.	Nameof the farmer/Parentage	Village/CRC	Source of DFLs	Name of the Hybrid	No. of DFLs Reared	Total Production				Yield/ 100 DFLds (kg)	Single cocoon wt. gm	Single Shell wt. gm	SR (%)	No. of man days utilized in 50/100 DFLs of rearing
						Reeling cocoons (Kg)	Double cocoons (kg)	Damage cocoons (kg)	Total Yield kg					
1-	Smt. Premwati W/O Sekhar	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	18.000	1.300	1.000	20.300	40.600	1.46	0.25	17.12	25/50
2-	Sri Ramesh S/O Roop Ram	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	19.000	1.300	0.500	20.800	41.600	1.32	0.23	17.42	24/48
3-	Sri Prem Singh S/O Ramdeo	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	15.000	2.000	0.300	17.300	34.600	1.36	0.22	16.18	26/52
4-	Sri Balam S/O Phul Singh	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	18.000	1.900	1.200	21.100	42.200	1.58	0.28	17.72	25/50
5-	Sri Sadhu Ram S/O Chhote Lal	Singhaniwala	NSSO, Bangalore	CSR2 x CSR4	50	15.000	1.000	0.300	16.300	32.600	1.45	0.24	16.55	26/52
6-	Sri Ravindra S/O Khajan	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	13.000	2.000	1.200	16.200	32.400	1.45	0.24	16.55	26/52
7-	Sri Rinku S/O Palli	Shekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	12.500	1.800	1.300	15.600	31.200	1.39	0.21	15.11	24/48
8-	Smt. Patti Devi W/O Milu	Sekhonwala	NSSO, Bangalore	CSR2 x CSR4	50	13.000	1.200	0.200	14.400	28.800	1.24	0.20	16.13	25/50
9-	Sri Yamin S/O Hamid	Sekhon wala	NSSO, Bangalore	CSR2 x CSR4	50	20.100	1.000	0.300	21.400	42.800	1.41	0.26	18.44	26/52
10-	Smt. Reena W/O Pawan	Sekhon wala	NSSO, Bangalore	CSR2 x CSR4	50	17.000	0.500	0.200	17.700	35.400	1.38	0.23	16.67	25/50
				Total	**500**	**160.60**	**14.00**	**06.50**	**181.10**	**362.200**				**252/504**
				Average	**50**	**16.600**	**1.400**	**0.650**	**18.110**	**36.220**				**25.20/50.40**

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CONCLUSION

It is observed from the comparative study that average cocoon yield was 34.26 kg in shoot rearing; however 31.54 kg/100 DFLs in tray rearing during spring crop-2020. Same way during autumn crop-2020, the average cocoon yield was 43.04 kg in shoot rearing, however 36.22 kg/100 DFLs in tray rearing. It was observed that yield is at par or better with shoot rearing in comparison to traditional tray rearing. The data reveal that the shoot rearing performance on all pre cocoon rearing parameters was at par or better with shoot rearing in comparison to tray rearing including shell%. It was due to lesser handling in shoot rearing method in comparison to individual leaf plucking method or tray raring. Hence shoot rearing technology is recommended over tray rearing method.

Data obtained revealed that average number of man days utilized for 100 DFLS of shoot rearing was 25.60 in spring crop -2020, while as in tray rearing it was 51.20 and same way in autumn season the average man days utilized for shoot rearing of 100 DFLs was 25.20 while as in autumn-2020 it was 50.40, and thus saving of almost 25 man days in reaing of 100 DFLs. In monetary terms it comes to 25 x 500= Rs. 12500=00 (@Wages Rs. 500/ man days/day).

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