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ERI SILKWORM CROP PERFORMANCE AS INFLUENCED BY REARING BED SPACING

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Abstract: Effect of different level of spacing provided to the fifth instar larvae of eri silkworm in the rearing bed under large scale commercial rearing was studied. Bed spacing of 1000-1200 square feet for rearing of 100 egg layings (100 dfls) at the rate 30-35 larvae per square feet was found optimum for better growth and development worms, cocoon yield and silk ratio. Decrease in bed spacing below 1000 sq. ft. / 100 dfls *i.e.* 40 larvae and above per square feet resulted into significant adverse impact on rearing performance of the silkworm and its economic traits. Hence, large scale eri silkworm rearing on tapioca required sufficient infrastructure to maintain rearing bed size accordingly corresponding to quantum of larvae to be reared.
Keywords: Eri silkworm, *Samia cynthia ricini*, rearing bed spacing, economic traits, cocoon yield, silk ratio.

Introduction

Ericulture traditionally practiced in small scale for domestic consumption in Assam and other part of North East India is introduced commercially in nontraditional states where the food plants of eri silkworm, castor and cassava are cultivated largely. A part of foliage is used for eri silkworm rearing to generate additional income to the farmers without affecting yield and income of main produce (Sakthivel *et al*., 2016). The huge foliage obtained from cassava at the time of removing weak branches 5-6 months after plantation and during tuber harvest are diverted for production of eri silk (Sakthivel and Qadri, 2017.) Further, forced harvest of about 20-30% of leaf from cassava once at 8th month did not have any adverse impact on tuber yield and its quality and these foliage could also be used for production of eri silk commercially (Sakthivel, 2018; Sakthivel and Qadri, 2018). During large scale rearing, farmers need to provide adequate space for silkworm which is essential for their health, uniform growth and to get optimum cocoon yield (Sarkar, 1988). Thus, the present investigation aimed first time to find out the actual spacing required for large scale commercial rearing of eri silkworm.

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Materials and Methods

The eri silkworms were mass reared up to 4th instar following recommended package of practices (Anonymous, 2004) on leaves of 8 month old tapioca variety MVD1 cultivated under irrigated condition. After 4th moult the larvae were shifted to the wooden trays of 3' x 4' size at the rate of 30 (T_1), 35 (T_2), 40 (T_3), 45 (T_4), 50 (T_5), 55 (T_6) and 60 (T_7) larvae per square feet and reared till maturity. The matured worms were mounted on plastic collapsible mountages for formation of cocoon. The cocoons were harvested five days after mounting. Each treatment was replicated five times. The economic traits *viz.* larval duration, effective rate of rearing (%), cocoon yield (kg / 100 dfls), shell yield (kg / 100 dfls), number of cocoon per kilogram, single cocoon weight (g), single shell weight (g) and silk ratio (%) were recorded using standard procedure (Sakthivel, 2012).

Results and Discussion

The rearing bed spacing provided for fifth instar larva @ 30 larvae/ sq. ft. (*i.e*. 1200 sq. ft. / 100 dfls) registered superior performance in larval period (06.09 D:H), larval weight (6.85 g), ERR (93.20 %), Cocoon yield (77.640 kg/100 dfls), shell yield (12.24 kg/100 dfls) and SR (15.73 %) which was closely followed by 35 larvae/ sq. ft. *i.e*. 1000 sq. ft./ 100 dfls with corresponding values of 06.09 D:H, 6.73 g, 92.73%, 76.800 kg/100 dfls, 11.947 kg/100 dfls & 15.49 % respectively. Decrease in bed spacing below 1000 sq. ft. / 100 dfls resulted into significant adverse effect on rearing performance on the eri silkworm reared with minimum spacing @ 60 larvae/ sq. ft. *i.e*. 580 sq. ft. / 100 dfls (8:08 D:H, 5.55 g, 57.79 %, 38.890 kg/100 dfls, 34.454kg/100 dfls & 11.70 %), (Table 1). Qadri *et al*. (2004) recorded highest yield in rearing bed spacing provided @ 350-400 sq. ft. / 50 dfls. The bed spacing from the day of hatching till the cessation of feeding the eri silkworms plays a paramount role on the cocoon crop yield. A bed spacing of 1000-1200 sq. ft. /100 dfls @ 35-30 larvae / sq. ft. at final stage was found to have tremendous influence recording the highest yield and silk percentage compared to the rest treatments.

Table 1: Eri silkworm crop performance as influenced by rearing bed spacing (crowding) of fifth instar larvae

No. of larvae/ sq. ft.	Bed spacing / 100 dfls (Sq. ft.)	Larval Period (D:H)	Larval weight (g)	ERR (%)	Cocoon yield (kg/100 dfls)	Shell yield (kg/100 dfls)	No. of cocoons / kg	SCW (g)	SSW (g)	Silk (%)
T1-30	1200	06:09	6.85	93.20	77.640	12.243	420.52	2.384	0.375	15.73
T2-35	1000	06:09	6.73	92.73	76.800	11.947	423.74	2.375	0.368	15.49
T3-40	875	06:18	6.24	85.50	67.39	9.315	444.49	2.264	0.311	13.73
T4-45	775	07:03	5.79	79.23	60.170	8.041	460.83	2.190	0.290	13.24
T5-50	700	07:12	5.85	63.26	46.470	5.848	478.51	2.093	0.263	12.56
T6-55	635	07:20	5.49	61.28	41.130	4.726	522.37	1.90	0.220	11.57
T7-60	580	08:08	5.55	57.79	38.890	4.454	520.66	1.880	0.220	11.70
CD (5%)	--	--	0.112	1.398	0.901	0.990	21.24	0.063	0.029	1.117

These findings are on the similar lines as reported by Qadri *et al*. (2004) who recorded highest yield in rearing bed spacing of 800 sq. ft. / 100 dfls. Overcrowding of larvae *i.e.,* lesser rearing bed spacing thus cause poor growth due to under nourishment. It also causes poor ventilation and builds up toxic gases in rearing environment and leads to crop failure (Dandin *et al*., 2003). Sarkar (1988) reported overcrowding of eri silkworm to seriously affect the health of the worm leading to unequal growth among the worms of the same age, prolongation of spinning and also leads to increased disease incidence and He recommended 440 sq. ft. for rearing one ounce (30 g approximately 55 dfls) for tray rearing. This is in conformity with the present findings wherein the bed spacing of 1000 – 1200 sq. ft. / 100 dfls in last stage was found ideal to get the crop success.

In the present study it was observed that reduction in rearing space or overcrowding resulted to competition among the silkworm for food and inadequate intake led to unequal growth of worms which reflected adversely on the cocoon yield. Bed spacing at the rate of 1000-1200 Sq. ft. per 100 dfls was found optimum for better growth and development of eri silkworm and for maximum cocoon yield. Hence, large scale eri silkworm rearing on tapioca required sufficient infrastructure to maintain rearing bed size corresponding to quantum of dfls to be reared.

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