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Phenological Studies in New Eri Silkworm *(Samia ricini)* Hybrids in Relation to its Rearing Behavior in Assam Climatic Condition During Commercial Rearing Season

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Abstract Eri silkworm is extensively reared in all the North Eastern region of India. A pilot study was undertaken to obtain high yielding good performer of eri silkworm hybrids in Assam climatic condition. Among 26 ecoraces maintained the good performer ecoraces viz. Borduar, Diphu, Sodiya,Wakhagree, Dhemaji were utilized for F_1 hybrid preparation and their performance were studied during summer under agro climatic condition of Assam for higher productivity and their economic traits were recorded. The biometry of the new eri F_1 hybrids were evaluated as per Manno's evaluation index. Among the seven hybrids the highest cumulative index value was recorded in Borduar X Sodiya (484.64) followed by Borduar × Wakhagree (444.88) and Diphu (W) × Wakhagree (425.88) respectively.

Keywords Eri silkworm, Hybrids, Economic utility, Evaluation index, Conservation.

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Introduction

Sericulture is a rural industry for upliftment of rural poor in the rural areas. Considering the economic utility of the eri silk (Ahimsa silk) a few promising hybrids have been prepared and evaluate their eight quantitative characters under Assam climatic condition. Since Assam state is situated in the middle area of North East region surrounded by hills and it mainly comprises of plains of river Brahmaputra valley and Barak valley. The climate of Assam ranges from 8^0C to 38^0C with a yearly rainfall of average 2018 mm. So, considering the temperate condition of Assam there is a need for region specific eri hybrid suitable to the local climatic condition and which can be exploited commercially. Begum et al. (2000) opinioned that due to varied climatic conditions in India different breeds evolved are reared in different seasons. Identification of different season specific *Bombay mori* silkworm hybrids for Kashmir condition were carried out and three specific hybrids were identified (Quadir et al. 1997, Ueda et al. 1969, Watanabe 1928).

Climate influences the living organisms profoundly (Uvarov 1931) and silkworm, *Philisamia ricini*,is no exception. So, considering the agro climatic condition of Assam which influenced by soil, climate and other edaphic fators seven promising eri hybrids were studied in the autumn commercial crop season which falls under favorable season. The autumn season of Assam considered to be most congenial for silkworm rearing in Assam for higher yield. Thus, the present study was under taken to study

the quantitative performance of seven promising hybrid of *Philisamia ricini.*

Materials and Methods

Indoor eri silkworm rearing has been done using wooden tray. In chawki stage i.e. 1st and 2nd stage of eri silkworm, paraffin paper and foam pads were utilized to maintain the required temp of 26-28^{0}C and 85-90% humidity. Newly hatched silkworms were provided with fresh tender and succulent castor *(Ricinus communis)* leaves. Cleaning of the bed was done once during 1st and 2nd instars, 3rd instars were fed with medium maturity leaf. Feeding were provided 3 times. Cleaning of the bed was done once during 3rd instar, 4th instar larvae were fed with matured leaf. Bottom paraffin paper was replaced by old news paper and wet foam pad was dispensed. Daily cleaning of rearing was done following the indoor rearing methods of silkworm developed by Krishnaswami (1978, 1986).

A total of new seven eri silkworm hybrids were prepared viz. Borduar × Diphu, Borduar × Sodiya, Borduar × Wakhagree, Dhemaji × Sodiya, Dhemaji (R) × Wakhagree (W), Diphu (W) × Sodiya, Diphu (W) × Wakhagree and utilized for the present study on the hybrid. For each of these hybrids, five replications were maintained during the season for various trait and data were recorded.

In order to judge and confirm the superiority of the hybrids, Multiple Traits Evaluation Index Method was advocated by Mano et al. (1992, 1993). The index score in different traits thus denotes the performance of a hybrid combinations and with relatively higher index value were considered to have greater economic value.

Results and Discussion

The performance of some promising eri hybrids i.e. Borduar × Diphu, Borduar × Sodiya, Borduar × Wakhagree, Dhemaji × Sodiya, Dhemaji (R) × Wakhagree (W), Diphu (W) × Sodiya and Diphu (W) Wakhagree during autumn season at different tem-

Table 1. Evaluation index of hybrids of eri silkworm *(Samia ricini).*Borduar × Sodiya>Borduar ×Wakhagree>Diphu × Wakhagree >Dhemaji × Sodiya. *ERR-Effective rate of rearing, *SCW-Single cocoon weigth, *S.S.W-Single shell weight, *SR%-Shell ratio, *Y/100dfls-Yield per 100 disease free layings.

Sl. No.	Hybrids	Evaluation index value of fecundity	Evaluation index value of hatching	Evaluation index value of ERR (*) no	Evaluation index value of ERR wt	Evaluation index value of S.C.W(*)	Evaluation index value of S.S.W (*)	Evaluation index value of SR% (*)	Evaluation index value of Y/100dfl(*)	Total index value	Rank
1	Borduar × Diphu	59.45525	54.14322	51.04746	40.75102	47.09750	44.59966	35.04505	40.81300	372.952	
2	Borduar × Sodiya	54.78599	64.37340	68.44568	64.82857	62.82500	46.57581	58.01802	64.79674	484.649	I
3	Borduar × Wakhagree	61.01167	56.70076	50.13186	53.26531	61.05000	47.00170	62.43243	53.29268	444.886	II
4	Dhemaji × Sodiya	35.33074	43.40153	45.55326	56.24490	64.82500	46.21806	40.45045	56.26016	388.284	
5	Dhemaji × Sodiya	34.55253	32.40409	44.63765	50.54286	59.90000	47.18910	60.18018	50.56910	379.975	
6	Diphu × Sodiya	53.22957	44.16879	33.64925	31.51020	47.22500	44.94037	42.16216	31.58536	328.470	
7	Diphu × Wakhagree	51.67315	54.91048	56.54167	52.70612	58.95000	46.30324	52.07207	52.72357	425.880	III

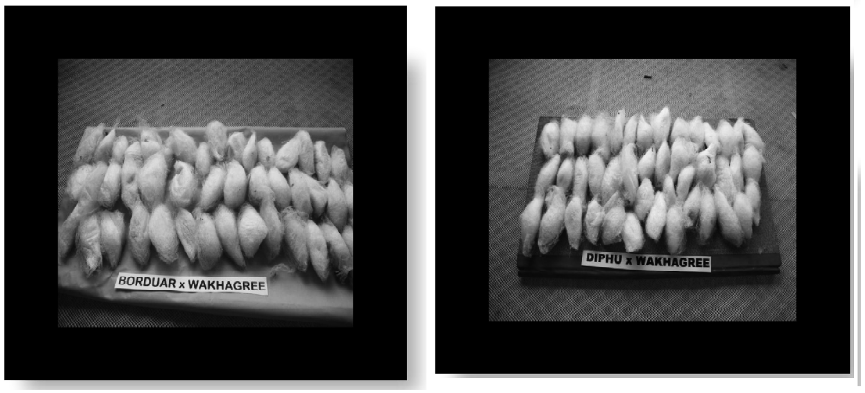

Fig. 1. New F_1 hybrids of eri silkworm *(Samia ricini).*

perature levels i.e., 24 ± 3 ^{0}C and 25 ± 5 ^{0}C with constant humidity of 79 ± 2 is given below : (Table 1), (Figs. 1–4).

Fecundity

The analyzed data revealed that fecundity of seven eri hybrids reared at 25 ± 5^{0}C and 79 ± 2% ranged from 322 (Dhemaji × Wakhagree) to 390 (Borduar × Wakhagree). Among the seven eri hybrids highest evaluation index value was observed in the eri hybrid Borduar × Wakhagree (EIV61.01167) followed by Borduar × Diphu (EIV59.45525) and Borduar × Sodiya (EIV54.78599, 55.58888).

Hatchability

The analyzed data revealed that hatchability of seven eri hybrids reared at 25±5^{0}C and 79±2% ranged from 85.5% Dhemaji (R) × Wakhagree (W) to 98.0% (Borduar × Sodiya). Hatching percentage was observed highest in Borduar × Sodiya (EIV 64.3734015) followed by Borduar ×Wakhagree (EIV56.7007673).

Effective rate of rearing (ERR/No.)

The economic output of silkworm hybrid rearing as reflected by effective rate of rearing in number (ERR) ranged from 6800 (Diphu (W) × Sodiya) to 8066.66 (Borduar × Sodiya) reared at 25 ± 5^{0}C and 79 ± 2%. Among the seven eri hybrids highest evaluation index value was observed in the hybrid Borduar × Sodiya (EIV68.4456) followed by Diphu (W) × Wakhagree (56.5416).

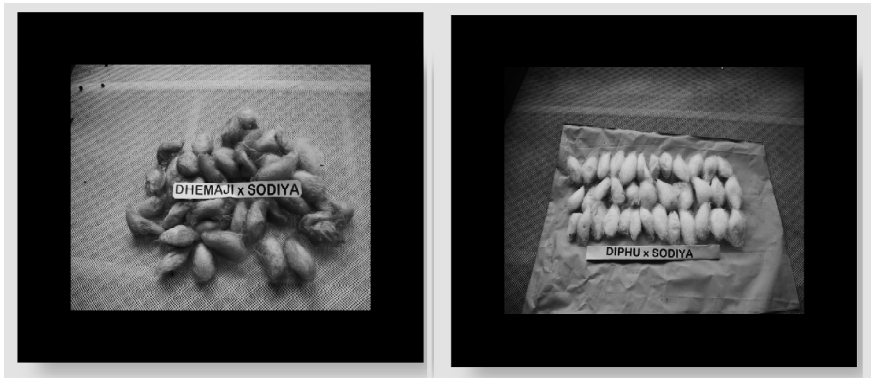

Fig. 2. New F_1 hybrids of eri silkworm *(Samia ricini).*

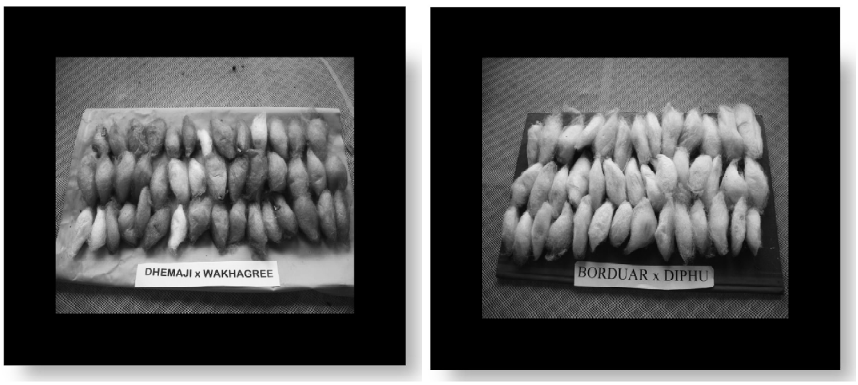

Fig. 3. New F_1 hybrids of eri silkworm *(Samia ricini)*

Cocoon yield/10,000 larvae by weight

The cocoon yield by weight ranged from 14.33 kg (DIphu (W) × Sodiya to 22.50 kg (Borduar × Sodiya) at 25 ± 5 ^{0}C and 79 ± 25. Significant difference in cocoon yield among the seven eri hybrids was noticed in Borduar × Sodiya (EIV 64.82857) followed by Dhemaji × Sodiya (EIV 56.2449) and Diphu (W) × Wakhagree (EIV 52.70612).

Single cocoon weight

Cocoon weight among seven eri hybrids reared at 25 ± 5 ^{0}C and 79 ± 2% ranged from 2.0749 g (Borduar × Diphu) to 2.784 g (Dhemaji × Sodiya). Significant difference in single cocoon weight among the seven eri hybrids was noticed in Dhemaji × Sodiya (EIV 64.825) followed by (Borduar × Sodiya) (EIV 62.825).

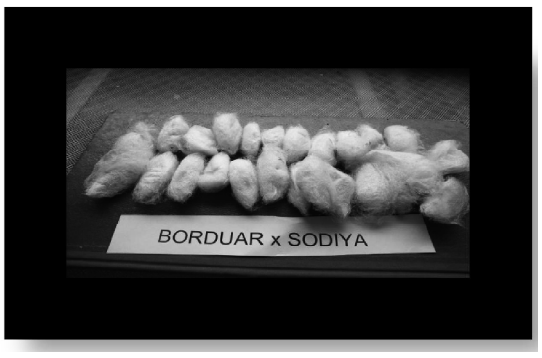

Fig. 4. New F_1 hybrids of eri silkworm *(Samia ricini)*.

Shell weight

The shell weight ranged from 0.219g (Borduar × Diphu) to 0.371g (Dhemaji (R) × Wakhagree (W) at 25 ± 5 ^{0}C and 79 ± 2% at 25 ± 5 ^{0}C and 79 ± 2 ^{0}C. Significant difference in shell weight for all the hybrids was recorded in Dhemaji (R) × Wakhagree (W) (EIV 47.1891) followed by Borduar × Wakhagree (EIV 47.0017 and Borduar × Sodiya) (EIV46.57581).

Shell percentage

The analyzed data revealed that shell ratio among seven eri hybrids reared at 25 ± 5 ^{0}C and 79 ± 2% ranged from 10.66% (Borduar × Diphu) to 13.7% (Borduar × Wakhagree). Significant difference was observed among seven eri hybrids in Borduar × Wakhagree (EIV 62.43243) followed by Dhemaji (R) × Wakhagree (W), (EIV 60.18018).

Yield

Cocoon yield was calculated as green cocoon wt with live pupae inside and expressed in terms of yield/100 dfls (kg). The cocoon yield among the seven eri hybrids reared at 25 ± 5 ^{0}C and 79 ± 2% ranged from 57.32. Diphu (W)× Sodiya (90.00 kg) Borduar × Sodiya. Significant difference was observed among the seven eri hybrids in Borduar × Sodiya (EIV 64.79675).

Conclusion

Analysis of the growth and economic traits of cocoon revealed that three eri silkworm hybrids viz. Borduar × Sodiya (EIV484.6492), Borduar× Wakhagree (EIV444.8864)andDiphu(W)×Wakhagree (EIV425.8803) are the most promising for commercial exploitation in agroclimatic condition of North eastern region of India.

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