International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 12 December 2025
DOI: 10.47191/ijcsrr/V8-i12-57, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

Seasonal Performance of Bivoltine Hybrid Seed Production by Procuring Seed Cocoons from Local ASRs Against Seed Cocoons Procured from Southern SSPCs

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ABSTRACT: The current study explores that the commercial silkworm seed production activities is not season specific in Udhampur district and the findings clearly reveal that the eggs recovery (65.83g/kg in FC_1 and 67.64g/kg in FC_2) was attained under self-generated seed cocoons from local ASRs and (53.50/kg in FC_1 and 73.95/kg in FC_2) eggs recovery was obtained from the seed cocoons procured from SSPC, Bangalore. Further, the cocoons dfls ratio over actual number of cocoons was found 2.56:1 in FC_1 and 2.48:1 in FC_2 under self-generated seed cocoons from local ASRs.

KEY WORDS: Dfls, FC_1, FC_2, Grainage, Recovery.

INTRODUCTION

Production of quality hybrid silkworm seed is skillful task and scientific approach of cocoon selection and their processing under grainage system. The silkworm seed plays a vital role because being a cash crop the vitality and disease freeness of the silkworm seed is utmost importance. Production of silkworm seed is not only free from diseases, but having high heterosis. Since 1989, silkworm seeds have been produced by Silkworm Seed Production Centre at Udhampur has been the only silkworm seed production Centre in J&K fulfilling the demand of F1 silkworm seed of cocoon farmers. In addition, the centre has been supplementing the bivoltine single and double hybrid silkworm seed to northern sericulture states, this unit also conducts chawki rearing of P1 seed (Dfls) and supplied to Adopted Seed Rearers (ASRs) and generates P-1 quality seed cocoons through extension network for self utilization being operated in three different P1 seed zones *viz.,* Suntha, Thill and Hartaryan of Udhampur district. SSPC, Udhampur has started grainage operations by procuring seed cocoons from south India marking a new beginning and proved that the seed production activities is not season specific, earlier SSPC produced silkworm seed in one crop only *i.e.*, spring. Further, the great success of our BV seed production depends largely on the quality seed cocoons generated by the poorest of the poor Adopted Seed Rearers (ASRs) of Udhampur district under different batches during spring season. Silkworm seed quality refers to richness of layings, egg viability, hatching uniformity and more importantly good rearing performance of the progeny (Ullal and Narashimhanna, 1981) and it depends on management practices *i.e.,* rearing temperature, humidity, nutrition and genotype of the breed (Smita *et al.,* 2015). Fecundity and hatchability are the two main factors for the seed cocoon production (Thomas and Dale, 1997). Further, sericulture industry is measured by quantity of silkworm seed produced (Sanaha *et al.,* 2016). Seed cocoon production is done in grainage or Silkworm Seed Production Centre is the place where large quantities of silkworm egg disease free layings (Dfls) are produced. Grainage is one of the essential parts of sericulture and silkworm seed is the backbone of the sericulture industry (Amardev and Munikrishnappa 2009; Munikrishnappa and Amardev 2009). Therefore the grainage operations directly reflect on survival rate, life span, growth, and quality of cocoon, *etc*. Hence, it is indispensable to conduct these grainage processes with utmost care and technique (Rahmathulla, 2012). Keeping in view, an investigation was carried out to assess the seasonal performance of bivoltine hybrid seed production by procuring seed cocoons from local ASRs against seed cocoons purchased from southern SSPCs.

MATERIALS AND METHOD

To assess the seasonal performance of hybrid seed production a total 1696 kg of P1 bivoltine seed cocoons of FC_1 and FC_2 were procured from P2 BSF Gavimata, 260 kg of P1 bivoltine seed cocoons of FC_1 and FC_2 procured form SSPC, Bangalore and

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3052.90 Kg P1 bivoltine seed cocoons of FC_1, FC_2, SH_6 & NB_4D_2 procured from local Adopted Seed Rearers (ASRs). After receiving the seed cocoons were spread in a single layer and defective cocoons were sorted out. Thereafter cocoons were cuts open, male and female pupae separated out and placed in the trays @ 700 pupae per tray. Male and female were kept in separate rooms at 25°C and 75±5 RH. After 12 days of spinning, the emergence started. Paired the male of FC_1 with FC_2 and vice versa for preparing the double hybrids combinations and similar procedure was followed for the preparation of traditional hybrid SH_6 and NB_4D_2. Depaired the moths after allowing for 03 hour mating. Placed the female moths in oviposition room for eggs laying by maintaining 25°C and 75±5 RH.& complete darkness. Male moths were kept in cold room at 7-9°C for their use in 2nd time. After completing 24 hour, the female moths were shifted to aestivation room 25°C and 75±5 RH. After 48 hour the female moths were filled for testing and sheet hanged for 10 days aestivation schedule. After 10 days, eggs were detached & washed and for loose eggs preparation. After drying the eggs were shifted to Cold Storage Plant (CSP) Dehradun for hibernation under 04/6/10 months schedule. The collected data on the economic parameters such as a pupation rate, average cocoons per kg, dfls obtained, total seed weight, cocoon dfls ratio over actual number of cocoons and egg recovery was calculated and the results are presented (Tables 1-5 & Fig. 1-4)

RESULTS AND DISCUSSION

Production of quality seed is a vital step which is the core purpose of a silkworm seed production centre and to achieve this task the quality of parental seed cocoons must be of high quality and in good health, and therefore the seed cocoons arriving at the grainages are subjected to rigid selection (Jolly, 1983; Singh and Saratchandra, 2004). In selection only sound and uniform cocoons conforming to the characteristics of the race of the parental stock are selected and defective and deformed, under and oversized cocoons, double, melted cocoons etc. are rejected. The results of the findings showed that a total of 825.500 kg in the case of FC_1 and 870.500 Kg of FC_2 seed cocoons were procured from P2 Gavimata to assess the grainage performance (Table-1), after assessing it was found that the highest seed recovery was found in lot 25 of FC2 (72.97g/kg) followed by lot 27 (65.32g/kg) and lot 30 (64.18g/kg) in FC1. The seasonal performance of the seed procured from Bangalore also depicted better seed recovery (73.95/kg) in FC1 with percentage increase over (8.95 %) (Fig-4). Further, the performance of seed cocoons generated through local ASRs also depicted remarkable performance in both double and single hybrid seed and the most significant parameter *i.e.,* egg recovery g/kg of seed cocoons utilized was attained with seed recovery of 67.64g/kg in FC_2 with percentage increases over (2.64%) and 63.46g/Kg in NB4D2 with percentage increase over (18.46%) (Fig-4).

Table1. Seed cocoons procured from P2 BSF Gavimata October & November, 2025

Lot	Race	Cocoons Procured and its commutative effective Pupation rate				Actual Numbers of Processed cocoons		
		By Weight (Kg)	By No's	Av. cocoons per kg(By No's)	Av. Pupation (%)	By No's	By Weight (Kg)	Av. cocoons per kg(By No's)
24	FC1	244.4	153697	629	87	134618	220.133	611
25	FC2	289.0	180183	623	87	157178	260.228	604
26	FC1	227.1	142444	627	88	126116	202980	612
27	FC2	267.4	174061	651	85	148633	239.586	620
30	FC1	354.0	219589	620	91	200306	327.068	612
31	FC2	314.1	198217	631	89	177200	286.671	618

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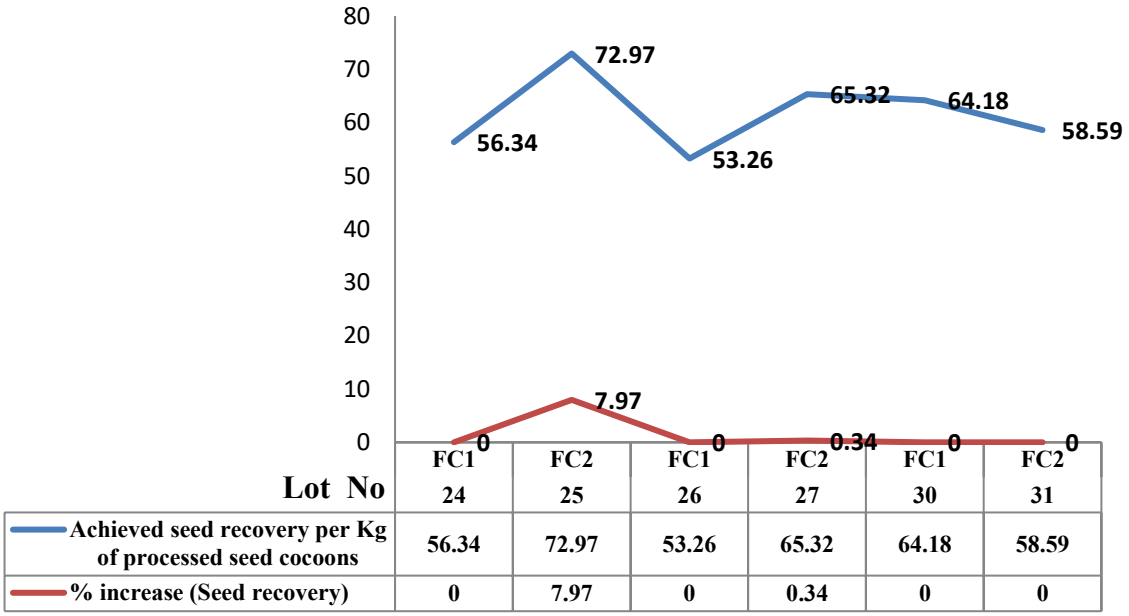

Fig 1. Seed recovery achieved by processing seed cocoons procured from P2 BSF Gavimata October & November, 2005.

Table 2. Seed cocoons procured (FC_1 & FC_2) from P2 BSF Gavimta October & November, 2025 and its grainage performance assessment on pairs & dfls obtained, pairs % over actual number of procured cocoons (No), Dfls (%), Qty. of Produced Seed (Kg) & Cocoons Dfls ratio over actual No. of cocoons.

Lot	Race	Dfls Obtained	Dfls Obtained	Pairs % over actual number of procured cocoons (No)	Dfls (%)	Qty. of Produced Seed (KGs)	Cocoons Dfls ratio over actual No. of cocoons
24	FC1	50870	45900	33.09	29.86	13.77	3.34:1
25	FC2	71750	70300	39.82	39.01	21.09	2.56:1
26	FC1	42750	37800	30.02	26.54	12.096	3.76:1
27	FC2	57450	54600	33	31.36	17.472	3.18:1
30	FC1	74620	71000	33.99	32.34	22.72	3.09:1
31	FC2	66400	57500	29.01	33.5	18.4	3.44:1

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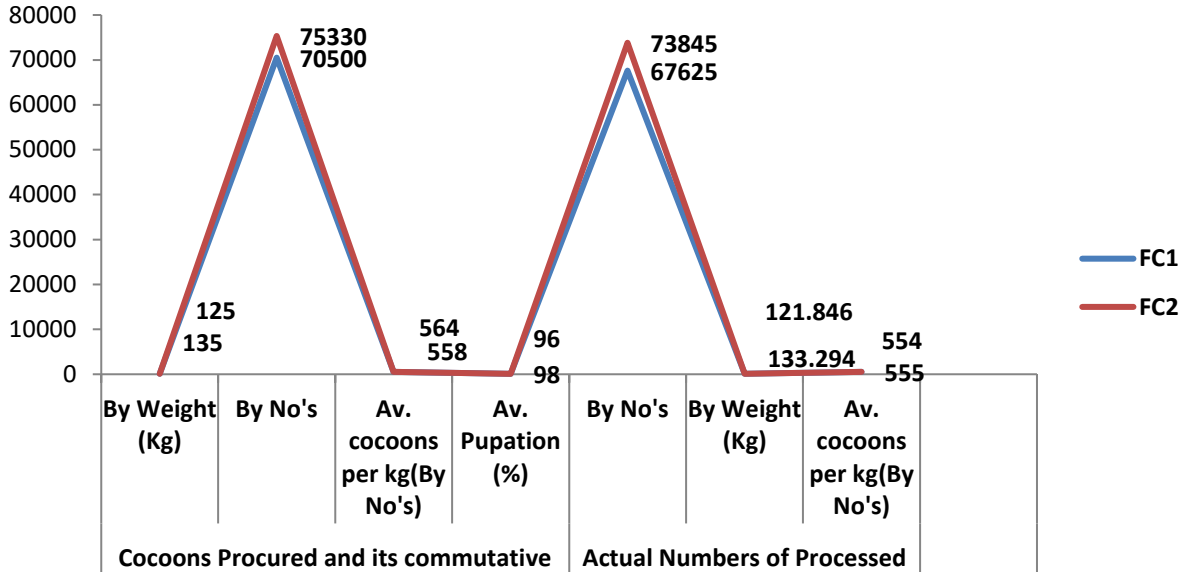

Fig 2. Seed cocoons procured from SSPC, Bangalore October, 2025

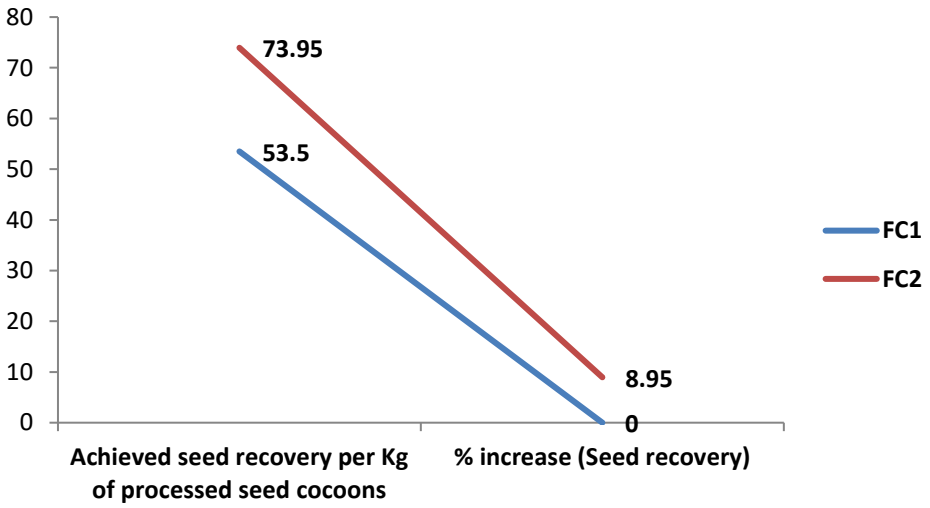

Fig 4. Seed recovery achieved by processing seed cocoons procured from SSPC, Bangalore October, 2025.

Table 3. Seed cocoons procured (FC_1 & FC_2) from SSPC Bangalore October, 2025 and its grainage performance assessment on pairs & dfls obtained, pairs % over actual number of procured cocoons (No), Dfls (%), Qty. of Produced Seed (Kg) & Cocoons Dfls ratio over actual No. of cocoons.

Lot	Pairs Obtained	Dfls Obtained	Pairs % over actual number of procured cocoons (No)	Dfls (%)	Qty. of Produced Seed (Kg)	Cocoons Dfls ratio over actual No. of cocoons
28	23270	20900	33.00	29.64	6.688	3.37:1
29	31750	31200	42.14	41.41	9.984	2.41:1

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Table 4. Seed cocoons procured (FC_1 & FC_2) from P2 BSF Gavimta November 2025 and its grainage performance assessment on pairs & dfls obtained, pairs % over actual number of procured cocoons (No), Dfls (%), Qty. of produced Seed (Kg) & cocoons Dfls ratio over actual No. of cocoons.

Lot	Pairs Obtained	Dfls Obtained	Pairs % over actual number of procured cocoons (No)	Dfls (%)	Qty. of Produced Seed (Kg)	Cocoons Dfls ratio over actual No. of cocoons
30	74620	71000	33.99	32.34	22.72	3.09:1
31	66400	57500	29.01	33.5	18.4	3.44:1

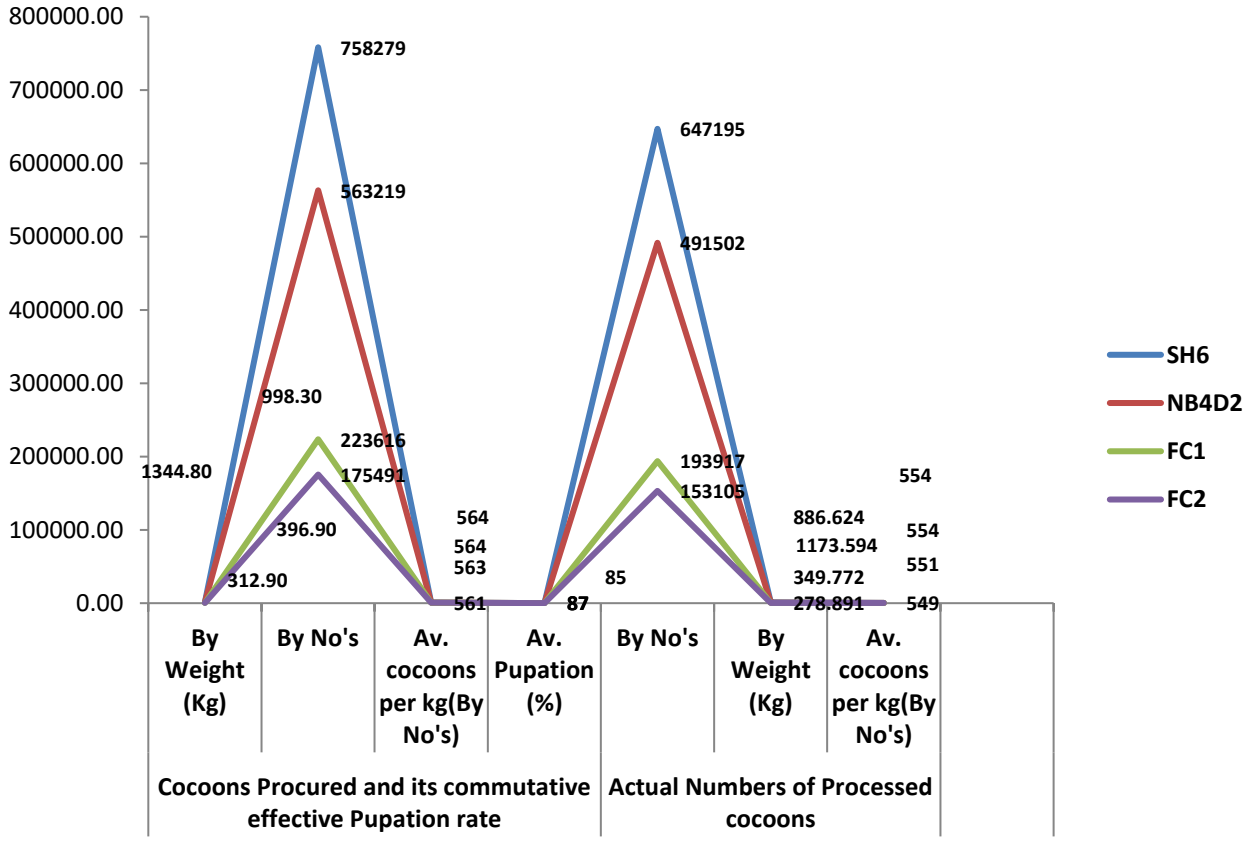

Fig 3. Seed cocoons procured from local Adopted Seed Rearers (ASRs) associated with SSPC, Udhampur (April-May, 2005).

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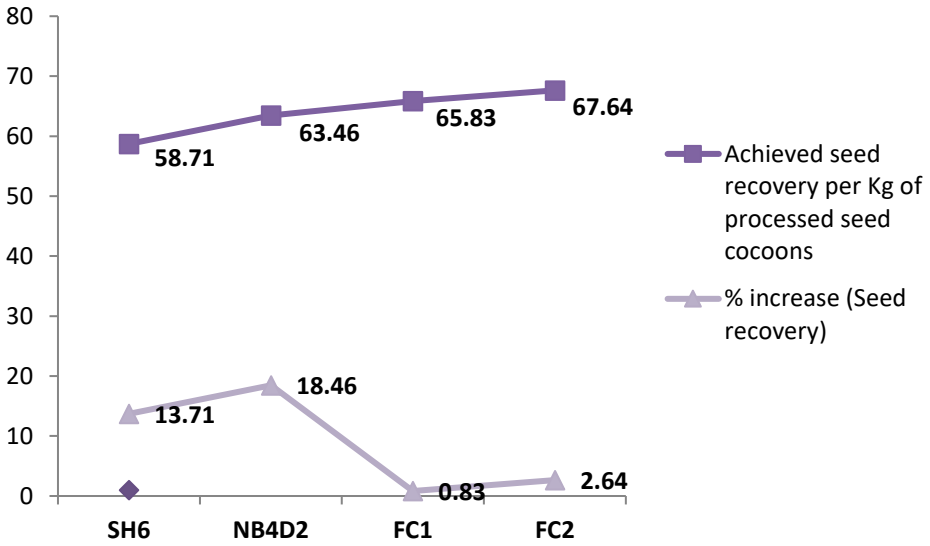

Fig 4. Seed recovery achieved by processing seed cocoons procured from local Adopted Seed Rearers (ASRs) associated with SSPC, Udhampur (April-May, 2005).

Table 5. Seed cocoons procured (SH6, NB4D2, FC_1 & FC_2) from local Adopted Seed Rearers (ASRs) associated with SSPC, Udhampur (April-May, 2005). and its grainage performance assessment on pairs & dfls obtained, pairs % over actual number of procured cocoons (No), Dfls (%), Qty. of produced Seed (Kg) & cocoons Dfls ratio over actual No. of cocoons.

Lots	Pairs Obtained	Dfls Obtained	Pairs % over actual number of procured cocoons (No)	Dfls (%)	Qty. of Produced Seed (Kg)	Cocoons Dfls ratio over actual No. of cocoons
1,6,7,8,15A,16-A,17-A,21,23	270740	263200	35.7	34.71	78.96	2.88:1
2,5,11,12,18,22	216400	211200	38.42	37.49	63.36	2.66:1
3,10,14,20	89320	87100	39.94	38.95	26.13	2.56:1
4,9,13,19	72120	70550	41.09	40.2	21.165	2.48:1

CONCLUSION

Seasons provide distinct environmental conditions, but the current study clearly revealed that, the silkworm seed production may be taken in any season by maintaining the required environmental conditions during silkworm seed production and present seasonal trails undertaken by SSPC, Udhampur confirmed that the seed production activities is not limited to season-specific in future.

ACKNOWLEDGEMENT

The author expressed sincere gratitude to Smt. H. S. Sarvamangala, Scientist-D and Head, Silkworm Seed Production Centre, Central Silk Board (CSB-NSSO), Bengaluru and Dr. Prashant Natikar, Silkworm Seed Production Centre, Central Silk Board (CSB-NSSO), Bengaluru and Dr. Likhith Gowda M, Scientist-B & Incharge, P2 BSF, Gavimata, (CSB-NSSO), Karnataka for supplying bivoltine seed cocoons of FCs races at SSPC, Central Silk Board (CSB-NSSO), Udhampur.

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Cite this Article: Singh, A., Harlapur, V.K., Kumar, S. (2025). Seasonal Performance of Bivoltine Hybrid Seed Production by Procuring Seed Cocoons from Local ASRs Against Seed Cocoons Procured from Southern SSPCs. International Journal of Current Science Research and Review, 8(12), pp. 6467-6473. DOI: https://doi.org/10.47191/ijcsrr/V8-i12-57