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Assessing Performance of Bivoltine Hybrid Seed Production During Winter Season by Processing Seed Cocoons Procured from Southern States

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Abstract

The present findings on grainage performance during winter season which is first ever attempt at SSPC, Udhampur showed that the grainage operation was carried out successfully at SSPC, Udhampur as the parameters studied depicted better eggs recovery in both the hybrids prepared *i.e.,* 84.76g/kg in FC_1 and 79.93g/kg in FC_2 double hybrid. Further, the cocoons dfls ratio over actual number of cocoons was found 2.7:1 in FC_1 and 2.9:1 in FC_2.

Keywords: FC1, FC_2, Grainage, Egg Recovery, Dfls

Introduction

Grainage is one of the essential parts of sericulture and silkworm seed is the backbone of the sericulture industry (Amardev and Munikrishnappa 2004; Munikrishnappa and Amardev 2009) [3, 1]. Silkworm Seed Production Centre, Udhampur (J&K) has been supplementing the bivoltine traditional silkworm combinations *viz.,* SH_6 x NB_4D_2 and its reciprocal and double hybrid FC_1 x FC_2 and its reciprocal silkworm seed requirement of DOS, J&K (UT), Himanchal Pradesh, Uttarakhand, Uttar Pradesh, Haryana, Uttarakhand and Punjab. Besides, producing F-1 seed double and single hybrids, this unit also making supplies of P1 seed cocoons to Silkworm Seed production Centre, Dehradun since 2022. For the last one decade P1 seed cocoon generation through poorest of the poor Adopted Seed Rearers (ASRs) is increasing year after year due to effective supervision and guidance as well as supplying of chawki reared worms by SSPC, Udhampur and the unit utilizes the seed cocoons for self-single and double hybrid silkworm seed production. 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) [9]. and it depends on management practices *i.e.,* rearing temperature, humidity, nutrition and genotype of the breed (Smita *et al.,* 2015) [7]. Fecundity and hatchability are the two main factors for the seed cocoon production (Thomas and Dale, 1997) [8]. Further, sericulture industry is measured by quantity of silkworm seed produced (Sanaha *et al.,* 2016) [5]. 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) [4]. Therefore, an attempt was made to procure and process the seed cocoons in winter season first time at SSPC, Udhampur to assess the performance of grainage.

Materials and Method

A total 317.650 kg of P1 bivoltine seed cocoons of FC_1 and FC_2 were procured from the SSPC, Vijapura (Karnataka) during the month of February, 2021. 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. 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 06 month 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 in the form of graphs in (Fig.1-4).

The following formulae were used for the calculating the value of the important grainage parameter studied under the present study;

1. Quantity of dfls produced: $\frac{\text{Total weight of seed}}{\text{Weight per ounce (100 Dfls)}}$

2. Pairs % over actual no. of procured cocoons:

$$\frac{\text{Pairs obtained}}{\text{No. of good cocoon processed}}$$

3. Dfls %: $\frac{\text{Dfls obtained}}{\text{No. of actual good cocoons processed}}$

4. Cocoon dfls ratio. over actual no. of cocoons:

$$\frac{\text{No. of actual good cocoons processed}}{\text{Dfls obtained}}$$

5. Per kg of processed cocoons (Seed Recovery):

$$\frac{\text{Total seed weight}}{\text{Weight of good cocoons}}$$

Fig 1: Separation of male and =female pupae

Fig 2: Paired moth kept in a tray

Fig 3: Eggs laying

Results and Discussion

The core aim of grainage is the production of quality hybrid seed production and supply to F1 farmers and in order to produce good quality and healthy silkworm eggs the seed cocoons used for the purpose 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) [2, 6]. 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 performance of winter grainage showed that a total of 181.450 Kg ($FC_{1)}$ and 136.200 Kg of ($FC_{2)}$ seed cocoons were procured to assess the performance of winter grainage performance after assessing it was found that 96 and 91 pupation (%) was recorded in FC_1 and FC_2 respectively (Fig-1). The date pertaining to actual number of seed cocoons processed was 177.242 Kg in (FC_1) and 128.903 Kg in (FC_2) and the average cocoons per kg was found 690 and 672 by numbers in FC_1 and FC_2 (Fig -2). After processing the seed cocoons a total of 46950 and 32200 dfls were prepared for $FC_1 \times FC2$ and its reciprocal (Fig -3). The data related to most significant parameter *i.e.,* egg recovery g/kg of seed showed that the highest ever seed recovery of 84.76 g/Kg in FC_1 and 79.93 g/Kg in FC_2 was attained at SSPC, Udhampur during winter grainage (Fig 4).

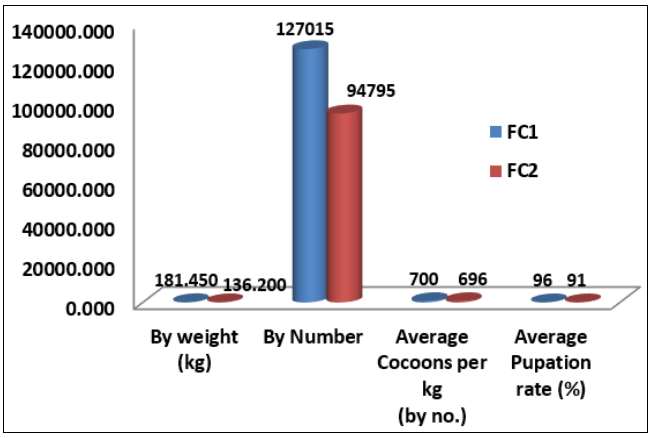

Fig 1: Cocoons procured and its commutative effective pupation (%)

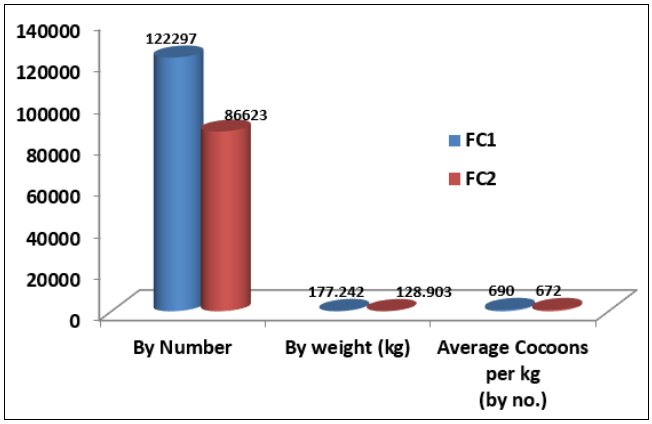

Fig 2: Actual number of processed cocoons for winter grainage operation

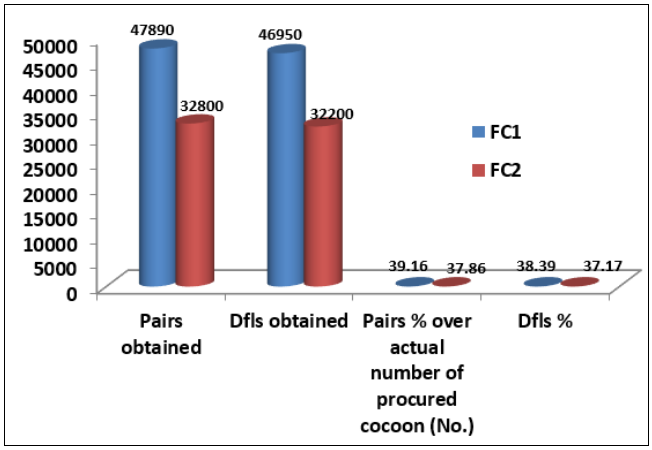

Fig 3: Data on some economic parameters of grainage pairs/dfls obtained, pairs % over no. of procured cocoons and dfls %

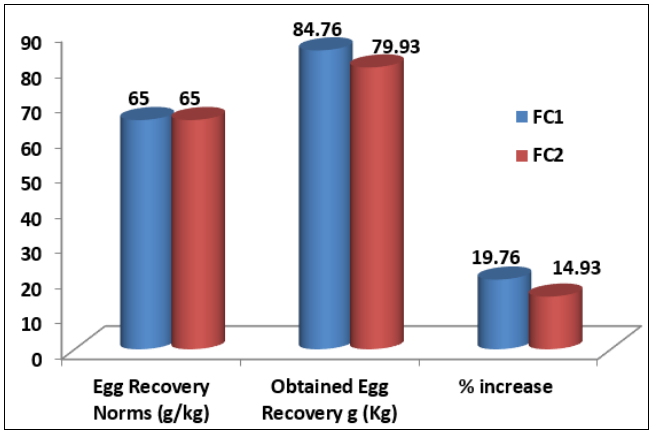

Fig 4: Egg recovery obtained of FC_1 and FC_2 (g/kg of processed cocoons)

Conclusion

The current trail has determined that the winter grainage has performed better in achieving the eggs recovery per Kg of seed cocoon processed, which is significantly higher than the norms set for. Because of this successful outcome, SSPC, Udhampur has proved that by maintaining required environmental conditions during the grainage operation the seed production activity is not limited to only one particular season.

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