

Production Performance of Autumn Grainage by Processing P1 Bivoltine Seed Cocoons Procured From Southern State of India

Paper Submission: 12/07/2020, Date of Acceptance: 25/07/2020, Date of Publication: 28/07/2020



Amardev Singh
Scientist-B & Incharge,
Silkworm Seed Production
Centre,
Udhampur, J&K (UT)



V.K. Gupta
Scientist-D & Incharge,
ZSSO, Premanagar,
Dehradun, Uttarakhand, India



N.K. Bhatia
Scientist-D,
ZSSO, Premanagar,
Dehradun, Uttarakhand, India

Abstract

Many factors contribute for the success of sericulture, among them silkworm seed plays a vital role because being a cash crop the vitality and disease freeness of the silkworm seed is of utmost importance. Production of silkworm seed is not only free from diseases but having high heterosis. The present study on grainage performance during autumn season 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.*, 55.48g/kg in FC₁ and 58.51g/kg in FC₂ double hybrid. Further, the cocoons dfls ratio over actual number of cocoons was found 3.52:1 in FC₁ and 3.02:1 in FC₂.

Keywords: Dfls, FC₁, FC₂, Grainage, Recovery.

Introduction

Silkworm Seed Production Centre, Udhampur, is the only seed production centre in the Jammu and Kashmir (UT) which is catering the need of the cocoon growers for the past many years. Since its inception, this centre has been supplementing the bivoltine hybrids silkworm seed requirement of DOS, Jammu and Kashmir (UT), Himanchal Pradesh, Uttarakhand, Uttar Pradesh, Punjab. Besides, producing F-1 seed double and single hybrids, this unit also conducts chawki rearing of P1 seed (Dfls) and supplied to Adopted Seed Rearers (ASRs) and generates P-1 seed cocoons through extension network being operated in three different P1 seed zones *viz.*, Suntha, Thill and Hartyan of Udhampur district. For the first time SSPC, Udhampur during the year 2019-20 has started autumn grainage by procuring seed cocoons from South India, 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 during spring season.

Review of Literature

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).

Objective of The Study

To assess the performance of grainage during autumn season by procuring P1 seed cocoons from southern state of India.

Materials and Method

A total 450.500 kg of P1 bivoltine seed cocoons of FC₁ and FC₂ were procured in three different lots from the SSPC, Vijayapura (Karnataka). After receiving the seed cocoons were spread in a single layer and defective cocoons were sorted out. Thereafter cocoons were cut 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 FC₁ with FC₂ and vice versa for preparing the double hybrids combinations. Dapaired 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 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 parameter studied under the present investigation;

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



Fig 4. Eggs drying

Results and Discussion

The main aim of a silkworm seed production centre is the production of quality seed and in order to produce good quality and healthy 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). 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 over sized cocoons, double, melted cocoons etc. are rejected. The results of the findings showed that a total of 217.3 kg in the case of FC₁ and 233.5 Kg of FC₂ seed cocoons were procured to assess the autumn grainage performance

(Fig-1), after assessing it was found that 87.3 and 83.66 %pupation rate was recorded in both the races. The Fig -2 revealed that the actual number of cocoons processed was 193.22 kg and 190.19 kg for both the races and the average cocoons per kg was found 646 and 587 by numbers in FC₁ and FC₂ (Fig - 2). After processing the seed cocoons a total of 35700 and 37050 dfls were prepared for FC₁ X FC₂ and its reciprocal (Fig -3), thus a total 10.71 Kg and 11.115 Kg of silkworm seed was produced for both the double hybrids (Fig-4). The cocoon dfls ratio over actual number of cocoons were recorded 3.52:1 in FC₁ and 3.02:1 in FC₂ and the most significant parameter *i.e.*, egg recovery g/kg of seed cocoons utilized was attained with seed recovery of 55.48g/kg in FC₁ and 58.81g.Kg in FC₂ (Fig-4).

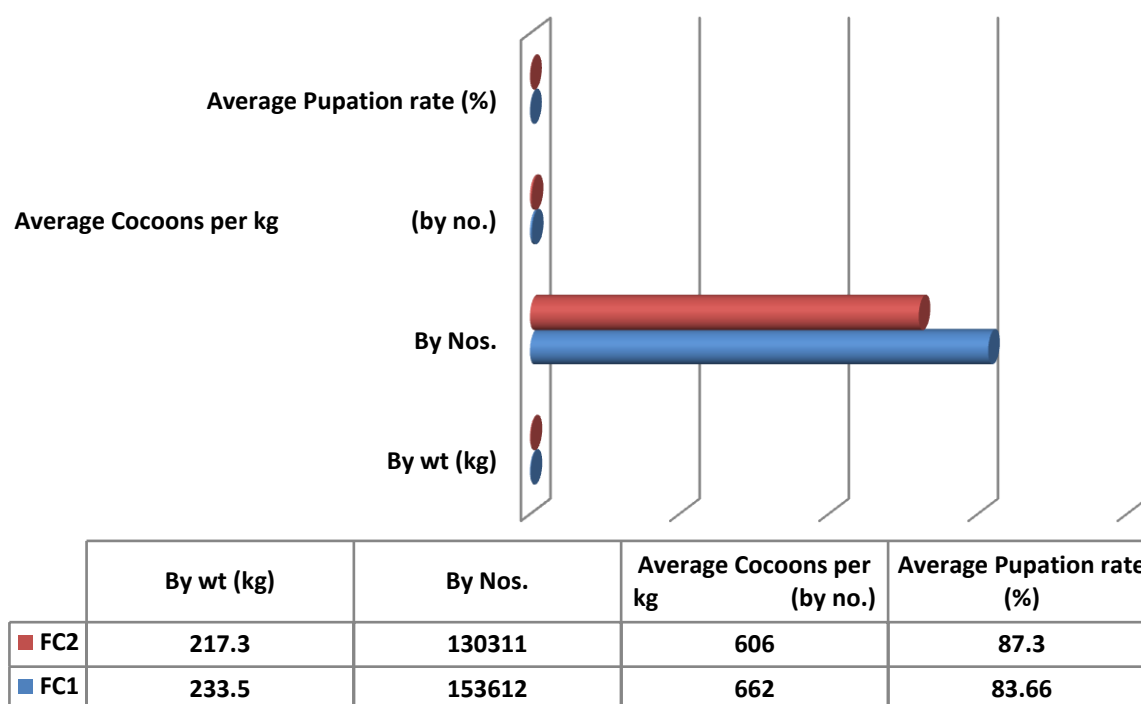


Fig 1. Cocoons procured by weight, number, average cocoon per Kg (by Nos) and pupation percentage.

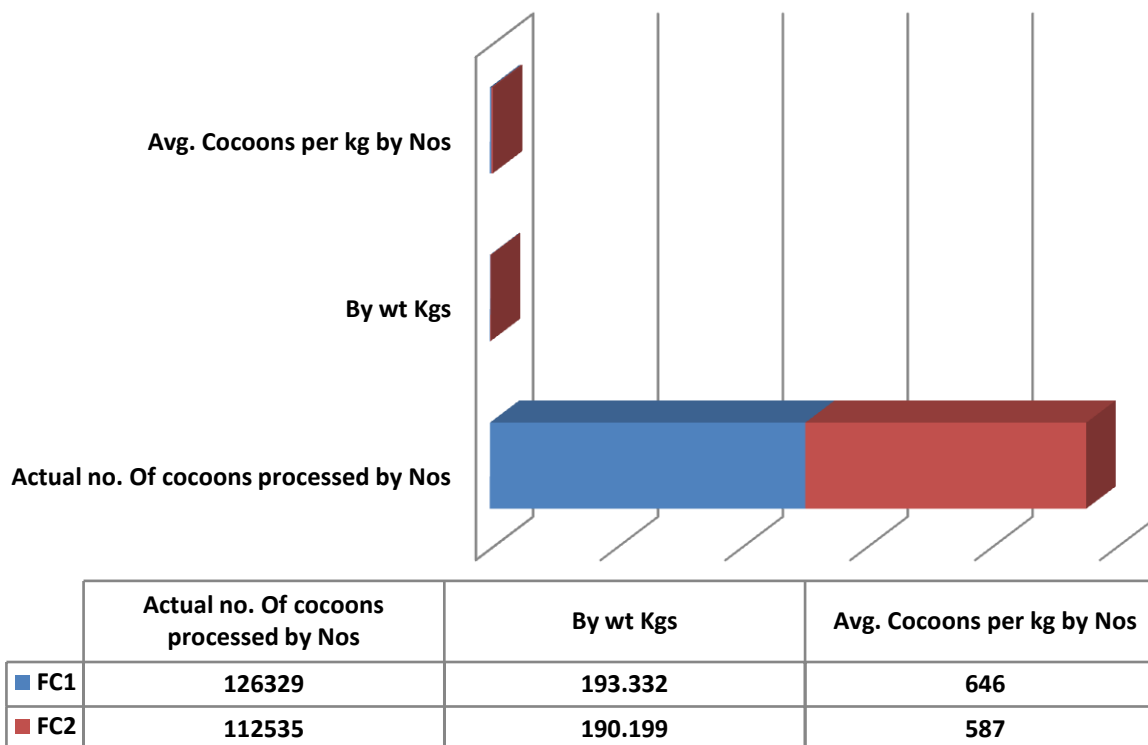


Fig 2. Actual numbers of cocoons processed by number/weight, and average cocoon numbers of good cocoons per Kg.

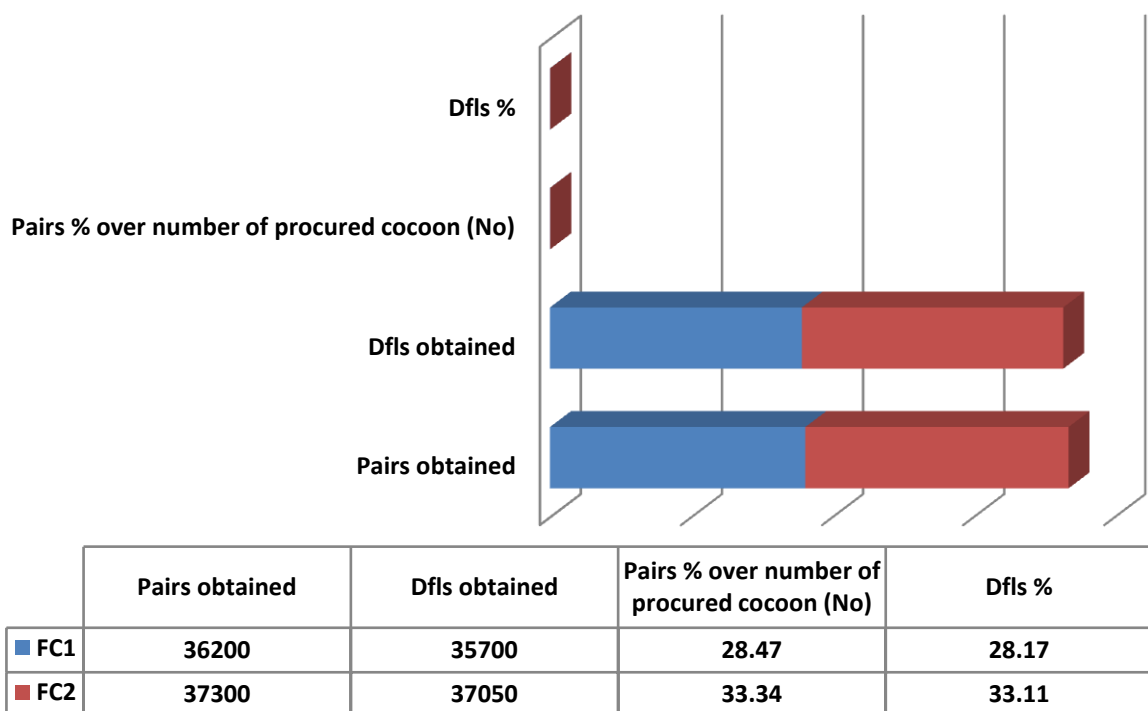


Fig 3. Data on some economic parameters of grainage pairs/dfls obtained, pairs % over no. of procured cocoons and dfls %.

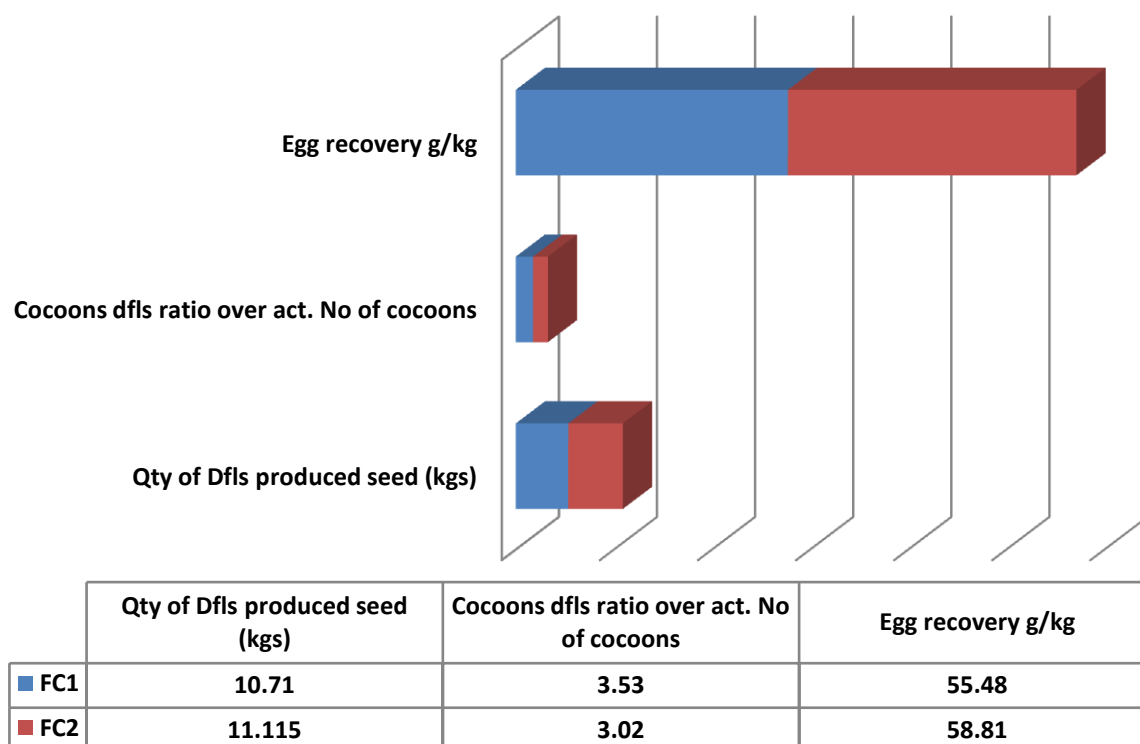


Fig 4. Data on some economic parameters of grainage quantity of dfls seed (kgs), cocoons dfls ratio over actual no. of cocoons and eggs recovery gram/kg of cocoons.

Conclusion

From the present study, it is concluded that the autumn grainage has shown better performance in attaining the eggs recovery per kg of seed cocoon was well above the norms set for by procuring the seed cocoons from southern part of India. This result has proved that SSPC, Udhampur will now undertake the grainage twice in a year (spring & autumn) instead of only one season i.e., spring

References

- Jolly, M.S. (1983). *Organization of industrial bivoltine grainage for tropics. Seric. Project No.3. C.S.R. and T.I. Mysore, Govt of India, pp: 19-20*
- Munikrishnappa, H.M. and Singh, A. (2009). *A study on economic performance of private grainages in Chamarajnagar district in Karnataka. Indian Journal of Sericulture. 43(2): 181-186.*
- Rahmathulla, V.K. (2012). *Review Article Management of Climatic Factors for Successful Silkworm (Bombyxmori L.) Hindawi Publishing Corporation. Psyche. Vol 12.:1-12.*
- Sanaha S. Pathan1, and Avinash Harale, D. (2016). *Silkworm Egg Counting System Using Image Processing Algorithm A Review*

.International Research Journal of Engineering and Technology: 03 (6):9-12. |

- Singh, A. and Munikrishnappa, H.M. (2004). *A study on functioning and farmers preference towards purchase of silkworm seed from private grainages-An opinion survey. Green farming. An International Journal of Horticultural and Allied sciences. Vol. 2 915 Spl.3):1097-1098.*
- Singh, T. and B. Saratchandra, (2004). *Principles and techniques of silkworm seed production. Discovery Publishing House, New Delhi, India, pp: 361.*
- Smita Shukla Gaurav, Surendra Prasad and Upadhyay V.B. (2015). *Influence of Cocoon Refrigeration on the Reproductive Ability of Multivoltine Mulberry Silkworm (Bombyx mori L.) Academic Journal of Entomology 8 (4): 183-189.*
- Thomas, G. and Dale, D. (1997). *Fecundity of mulberry refrigeration at various climates. Insect Environment, 3(3): 62-63.*
- Ullal, S.R. and Narashimhanna, M.N. (1981). *Handbook of Practical Sericulture. Central Silk Board, Bangalore India, pp: 61-82.*