

Assessment of Performance of Autumn Crop Over Spring in Temperate Region of Jammu & Kashmir

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Abstract—The present study was undertaken to assess the performance of autumn crop (August-September) over spring (May-June) in temperate region of Jammu and Kashmir by rearing the silkworm hybrid (CSR₂×CSR₄) in both spring and autumn seasons 2016. The rearing was carried out under uniformed laboratory condition by adopting standard method at Central Sericultural Research and Training Institute (CSR&TI), Central Silk Board, Pampore, Jammu and Kashmir. The farmers were more interested towards spring crop than autumn crop as in autumn crop the cocoon productivity is less as compared to spring, which may be due to leaf quality, disease incidence like BmNPV, etc during autumn season. These aspects can be managed by preventive measures if followed properly by the rearers. The silkworm hybrid CSR₂×CSR₄ performed well in spring season and at par in the autumn season as well when reared at CSR&TI, Pampore. A well established mulberry plantation of KNG (Japanese) for chawki rearing and Goshorami (Japanese) for late age rearing with uniform growth and vigour were used for the study. The rearing results revealed that hatching percentage was 97.47% in spring and 97.30% in autumn and shell ratio (SR %) was 22.09% in spring and 21.42% in autumn. The total cocoon yield per 100 dfls (disease free layings) was 60.90 kg and 57.33 kg in spring and autumn seasons respectively and pupation rate was 91.50% and 91.03% in spring and autumn seasons respectively. The present results indicate that by maintaining proper hygiene and quality leaf, the cocoon productivity in autumn season can be obtained at par with the spring season.

Keywords: silkworm, autumn, spring.

1. INTRODUCTION

Mulberry belonging to family Moraceae is primarily cultivated for rearing of silkworms and its contribution towards successful rearing is 38.2% (Miyashita, 1986). Silkworm has a large role in rural life in India being an insect of economic importance. The common silkworm *Bombyx mori* Linnaeus (Lepidoptera: Bombycidae) spins valuable silk fibre, making it one of the most beneficial insects to mankind and is becoming an attractive multifunctional material for both textile and non textile uses (Tsukada, 2005). The practice of sericulture consist of two major activities viz., cultivation of mulberry plants for producing healthy leaf to the silkworm larvae and the rearing of silkworm larvae to produce the quality cocoons, which is the raw material for the silk reeling industry. Success

in sericulture depends largely on major factors like breed, seed and feed. Quality of leaf influences the healthy growth of silkworm larvae and thereby the quality of cocoons (Hajare *et al.*, 2008). Significant and positive correlations have been reported between cocoon yield component traits with that of foliar constituents (Sannappa *et al.*, 2002). The state of Jammu and Kashmir produces high grade quality bivoltine silk from hybrids. It ranks 5th in the country cocoon production and is leader in high quality bivoltine silk (Mukherjee and Gautam, 1993). Jammu and Kashmir is bestowed with a climate well suited for the production of bivoltine silk of international quality having scope for taking three crops in a year from May to September from same plantation but farmers are reluctant to take second cocoon rearing mainly because of poor quality of leaf available during summer/autumn seasons that obviously affects the health of silkworms and cocoon crop (Nooruldin *et al.*, 2015). Now-a-days efforts are being made to enhance the cocoon crop production by popularising an additional commercial crop for autumn (Amardev Singh *et al.*, 2013). But poor quality of mulberry leaf and disease incidence during autumn season comes in the way of popularising second commercial rearing. In this context, present study was carried to assess the performance of autumn crop over spring in 2016 at Central Sericultural Research and Training Institute, Pampore, J&K.

2. MATERIALS & METHOD

The present investigation was carried out to assess the performance of autumn crop over spring in 2016 at the experimental farm of Central Sericultural Research and Training Institute, Pampore, J&K. A total of 50 dfls of silkworm hybrid (CSR₂×CSR₄) were reared at silkworm breeding and genetics laboratory in both spring and autumn seasons. A well established mulberry plantation of KNG (Japanese) for chawki rearing and Goshorami (Japanese) for late age rearing with uniform growth and vigor were used for the study. During this period silkworms were fed four times a day with fresh leaves harvested daily from the mulberry garden during the early hours of the day and stored to maintain moisture by covering wet gunny cloth. Disinfection was

carried out prior to silkworm rearing as a prophylactic measure against pathogens, which may in the rearing room are likely to infect the silkworms. The temperature and relative humidity were maintained at about $26 \pm 2^{\circ}\text{C}$ and around $70 \pm 10\%$ respectively for which a thermo-hygrometer was used to record the temperature and relative humidity in the rearing room. Recommended silkworm rearing method was adopted as suggested by Krishnaswami *et al.* (1978). The data of the economically important traits such as Fecundity (No.), Hatching percentage (%), larval weight (10 larvae in g), yield per 100 dfls (kg), good cocoon percentage (%), pupation rate (%), single cocoon weight (g), single shell weight (g) and shell percentage (SR%) were collected and statistically analysed by utilizing software SPSS (SPSS 16.0).

3. RESULTS & DISCUSSION

The present findings indicate that, the performance of $\text{CSR}_2 \times \text{CSR}_4$ in both spring and autumn seasons were at par with each other. The rearing results revealed that fecundity was 525 ± 2.29 in spring and 531 ± 2.26 in autumn and hatching percentage was 97.47 ± 0.11 in spring and 97.30 ± 0.09 in autumn season. In spring season $\text{CSR}_2 \times \text{CSR}_4$ recorded shell weight of 0.38 ± 0.002 and cocoon weight of 1.72 ± 0.001 and in autumn season recorded shell weight of 0.34 ± 0.001 and

cocoon weight of 1.62 ± 0.002 . The total cocoon yield per 100 dfls was 60.90 ± 0.40 and 57.33 ± 0.22 in spring and autumn seasons respectively and shell ratio (SR %) was 22.09 ± 0.02 and 21.42 ± 0.10 in spring and autumn seasons respectively. The pupation rate was 91.50 ± 0.29 in spring and 91.03 ± 0.20 in autumn and good cocoon percentage was 86.29 ± 0.24 in spring and 85.17 ± 0.30 in autumn season (Table-1). The huge difference in the weight of 10 full grown larvae between spring and autumn seasons clearly depicts the leaf quality in autumn season, which is in close agreement with Nooruddin *et al.*, 2015, who also reported that health of larva depends on quality of leaf.

The data revealed that, there is no significant difference between spring and autumn season with respect to fecundity, hatching and pupation rate while, significant difference observed in weight of 10 full grown larva, yield per 100 dfls, good cocoon percentage, cocoon weight, shell weight and SR%. The present findings were in agreement with Sannappa *et al.*, 2002. The results were also depicted in the form of graphs (Fig-1&2). It is evident from the results that autumn crop can also perform on par with the spring crop, if proper hygiene is maintained in the rearing room along with quality leaf.

Table 1: Performance of silkworm hybrid ($\text{CSR}_2 \times \text{CSR}_4$) in spring and autumn seasons 2016 (Kruskal Wallis Test)

Traits	Fecundity (No.)	Hatching (%)	Wt. of 10 full grown larvae (g)	Yield per 100 dfls	Good Cocoon (%)	Pupation Rate (%)	SCW (g)	SSW (g)	SR%
season	Mean \pm SE								
Spring	525 ± 2.29	97.47 ± 0.11	51.3 ± 0.24	60.90 ± 0.40	86.29 ± 0.24	91.50 ± 0.29	1.72 ± 0.001	0.38 ± 0.002	22.09 ± 0.02
Autumn	531 ± 2.26	97.30 ± 0.09	39.1 ± 0.21	57.33 ± 0.22	85.17 ± 0.30	91.03 ± 0.20	1.62 ± 0.002	0.34 ± 0.001	21.42 ± 0.10
Chi square	2.98	1.182	9.82	9.800	5.98	1.98	10.61	10.54	6.22
p	0.084*	0.277*	0.002**	0.002**	0.014**	0.159*	.001**	.001**	.013**

**Significant, * Non Significant, SCW= Single cocoon weight, SSW= Single shell weight

Hence, popularization of autumn crop in the temperate zone of Jammu & Kashmir can be done as second commercial rearing. Since, the climatic conditions of autumn season is much more congenial for the disease to spread in the rearing room it is advised to follow strictly all the preventive measures before the spread of diseases. Leaf quality also accounts for hindrance of autumn crop where pest/ disease incidence noticed abundantly in autumn season compared to spring. By adopting proper hygiene and leaf quality autumn crop will also excel in temperate region of Jammu and Kashmir.

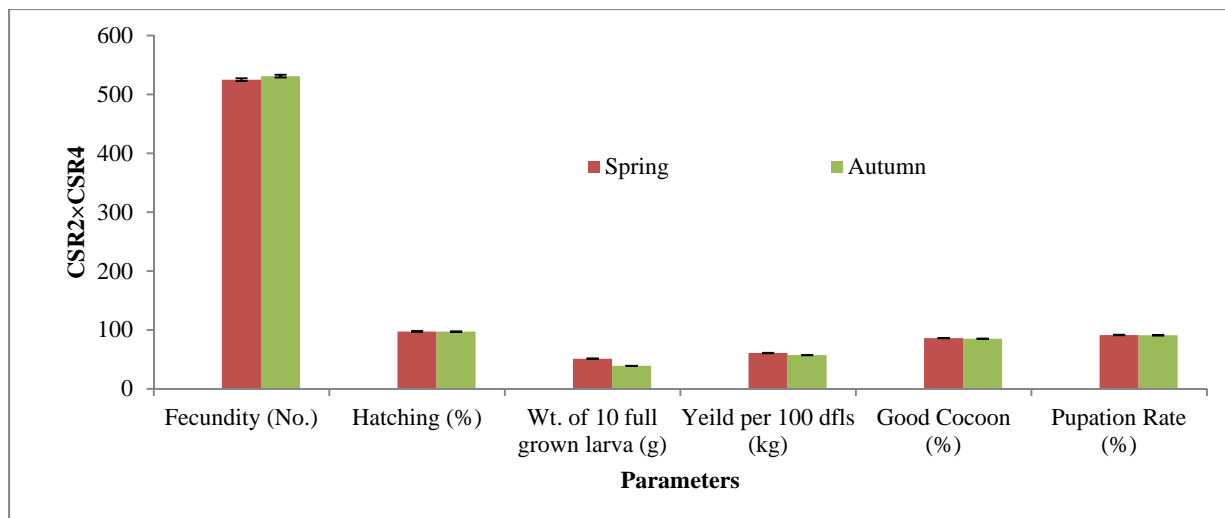


Fig. 1: Performance of silkworm hybrid (CSR₂×CSR₄) in spring and autumn seasons 2016

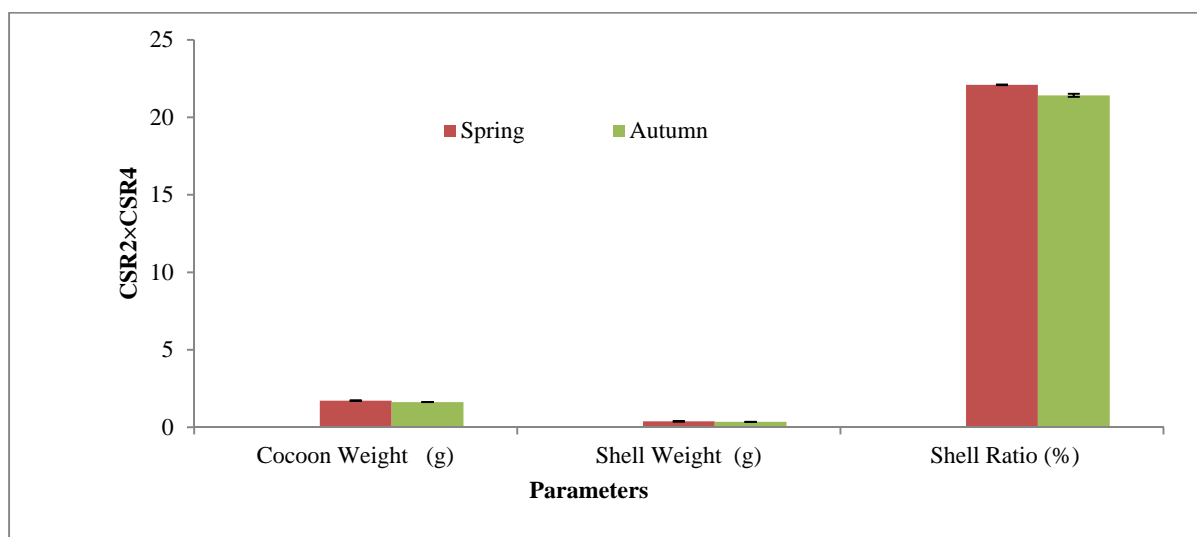


Fig. 2: Cocoon parameters of silkworm hybrid (CSR₂×CSR₄) in spring and autumn seasons 2016

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