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Exploration of sericulture in unexplored region of Jammu and Kashmir

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Abstract

Due to rapid urbanisation, sericulture in the state of Jammu & Kashmir has been restricted to higher peripheral areas only. For horizontal expansion of sericulture in the state, it is inevitable to introduce sericulture in unexplored areas. In this direction a study was undertaken to assess the feasibility of sericulture in Kargil area of Ladakh division, J&K. Trial rearing of silkworm double hybrid (FC2 x FC1) obtained from SSPC, Vijayapura, Bangalore was reared at village shilikchey, Kargil during 2017 (July-August) as a part of the 45 days Intensive Bivoltine Training programme to tribal farmers of Kargil conducted by Central Sericultural Research and Training Institute (CSR&TI), Central Silk Board, Pampore, J&K. Prior to this, a trial rearing was also conducted at Kargil in village Poyen during 2016 (June-August). The rearing results were encouraging to the scientific community for introducing the sericulture in Kargil. The rearing results revealed that hatching percentage was 80.32% during 2016 and 98.15% during 2017. In 2016 and 2017 double hybrid recorded total yield of 22.13 Kg/50 Dfls and 37.76 Kg/50 Dfls respectively. In 2016, Single Cocoon Weight (SCW) and Single Shell Weight (SSW) recorded as 1.60g and 0.30g whereas in 2017, Single Cocoon Weight (SCW) and Single Shell Weight (SSW) recorded as 1.72g and 0.38g. In 2016 and 2017 Shell Ratio (SR) recorded as 18.75% and 22.09% respectively. The present results indicate that by maintaining proper hygiene and feeding quality leaf the cocoon productivity in Kargil region can be at par with the other regions of the Country.

Keywords: silkworm, mulberry, exploration, Kargil

1. Introduction

Kargil is a district of Ladakh division in the Indian state of Jammu and Kashmir. The Kargil district (Altitude = 2,676m (8,780 ft) above sea level and Latitudes/ Longitude = 34° 01'N/76° 24 'E) is having an area of 14,086 km² and is around 200 km from Srinagar. Kargil is having cold and temperate climate with the maximum and minimum temperature of 29.2 °C and - 13.2 °C in the month of July and January respectively [3]. Maximum precipitation is received in March with an average of 82 mm. From November to April Kargil region is fully covered with snow and the National Highway connecting Srinagar to Kargil remains closed officially during these months [5]. Majority of the households are engaged in agriculture and allied activities. The major livelihood in Kargil region accounts for cultivation of Apricots along with green Apple [6]. Pastoral herding of yak, sheep and goats suits both nomadic and settled communities [1] while the latter also cultivate barley, wheat and peas [11]. Pastoralists trade dairy, wool and pashmina goat fibre to the Kashmir region. Arable farming of barley and wheat is tightly constrained to the summer months between May and September [8, 18, 14]. Since the region is surrounded by Rocky Mountains [16] with sparse vegetation, drinking water is a major issue and people rely mostly on bore wells, glacial melt water channels and springs. The present source of livelihood is not sufficient to meet the daily expenditure of poor farming community in Kargil. Therefore, efforts have been made to make the allied sectors of Agriculture like Sericulture economically viable for the people of Kargil district. The mulberry plants present in Kargil region are perennial, wild and unexplored. The major problem during the leaf harvesting process is separation of mulberry leaves from the big branches of mulberry trees which doubles the efforts for leaf plucking (Fig.3). Hence, systematic mulberry plantation must be introduced in this region through progressive farmers initially for increasing the mulberry wealth. The local people in this region utilize these mulberry leaves to feed cattle assuming that the milk production will be increased, so convincing the local people to practice sericulture is also major issue. Another major aspect is educating the local people regarding

the pruning schedule because the local people were in a myth that mulberry plants will die if pruned, so it is the responsibility of the sericulture experts and extension agencies of Sericulture Development Department (SDD), J&K to convince and motivate the people about the benefits of recommended sericulture practices for obtaining economic benefits [7].

The presence of naturally growing mulberry plants in Kargil shows that mulberry can thrive in this region by withstanding the harsh climate during colder months [13, 19]. Further, as mulberry is found surviving naturally in this cold arid zone it may possess notable genes suitable for cold or frost resistance. These available mulberry genetic resources could be used judiciously in mulberry breeding programmes for the betterment of the sericulture industry in J & K, India.

In this direction efforts are being made by Central Silk Board for introduction of sericulture by conducting training programmes and also by planning systematic mulberry plantations in Kargil region.



Fig 3: Leaf plucking/chopping

2. Materials and Methods

A total 50 Dfls (Disease free layings) of silkworm double hybrid (FC2 x FC1) obtained from Silkworm Seed Production Centre (SSPC), Vijayapura, Bangalore were reared at village Shilikchey, Kargil during July- August, 2017 as a part of the 45 days Intensive Bivoltine Training programme (Fig.5) to tribal farmers of Kargil conducted by Central Sericultural Research and Training Institute (CSR&TI), Central Silk Board, Pampore, J&K (Fig.4). Prior to this, a trial rearing was also conducted at Kargil in village, Poyen during June-August, 2016. 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. Disinfection was carried out prior to silkworm rearing as a prophylactic measure against pathogens (Fig.1). The natural mulberry flora in this region existing at present was utilised for silkworm rearing. The mulberry plants in this region are perennial, wild and grown over the years without any pruning schedule. Due to this it is inevitable to the rearers to climb trees for plucking the leaves (Fig.2). During the rearing period, silkworms were fed three times a day [10]. The fresh mulberry leaves were harvested from the mulberry trees during morning hours and late evening hours. Quality of leaf influences the healthy growth of silkworm larvae and thereby the quality of cocoons [9]. Significant and positive correlations

have been reported between cocoon yield component traits with that of foliar constituents [17]. Recommended silkworm rearing method was adopted as suggested by [12].

The data on the economically important traits such as Hatching percentage (%), Larval weight (10 mature larvae in g), Larval period, Yield per 100 dfls (kg), Single cocoon weight (g), Single shell weight (g) and Shell ratio (SR%) were recorded.



Fig 1: Disinfection Process



Fig 2: Leaf harvesting by trainees



Fig 4: Silkworms at 5th instar



Fig 5: Interaction Sessions

3. Results and Discussion

The present findings indicate the possibility of introducing sericulture in Kargil, Ladakh division of J&K. During 2016, the rearing results were not so encouraging due to the constraints faced at Kargil mainly shortage of leaf supply. But in 2017, those constraints were examined properly and managed successfully. The results were encouraging in 2017, due to the efforts put by the staff of CSR&TI, Pampore and support given by Ladakh Autonomous Hill Development Council (LAHDC), Kargil (Fig.6). In 2016 and 2017 double hybrid recorded total yield of 22.13 Kg/50 Dfls and 37.76 Kg/50 Dfls respectively. In 2016, SCW and SSW recorded as 1.60g and 0.30g whereas in 2017, SCW and SSW recorded as 1.72g and 0.38g. In 2016 and 2017 Shell ratio recorded as 18.75% and 22.09% respectively (Table-1). The reeling results of silkworm double hybrid reared at Kargil are presented in Table -2. Infact the data may depict that the double hybrid did not performed well in 2016, but it is not the double hybrid which didn't perform well, it is sole managerial constraints which were faced at Kargil. Even though the Double hybrid which was reared at Kargil during 2016 and

2017 was same but the brushing dates were different with a gap of more than one month. In 2016, rearing was started during middle of June whereas in 2017, rearing was started during the end of July. 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 [15]. Now-a-days efforts are being made to enhance the cocoon crop production by popularizing an additional commercial crop for autumn [4, 2]. There is huge scope for sericulture during spring and summer. Hence, first week of June to end of August or first week of September suits best for practicing sericulture at Kargil, Ladakh. The post cocoon data (Table-2) revealed that Average Filament length ranges from 878-910 m and Reelability ranges from 83-89 %. Renditta on good cocoons ranges from 2.79-2.72 kg and Raw silk recovery ranges from 71.36 – 73.12 %.



Fig 6: Trainees along with CSB staff and Lahdc officials

Table 1: Performance of silkworm double hybrid (FC2×FC1) at Kargil during 2016 and 2017

Year	Hybrid	Date of Hatching	Hatching %	Larval period (D)	Wt. Of 10 mature larvae (g)	Yield/ 100 Dfls (Kg)	SCW (g)	SSW (g)	SR%
2016	FC2x FC1	17/06/2016	80.32	30	39	44.26	1.60	0.30	18.75
2017	FC2x FC1	23/07/2017	98.15	30	44	75.52	1.72	0.38	22.09

4. Conclusion

From the two rearings conducted at Kargil during 2016 and 2017, it can be ascertained that commercial sericulture is possible in Kargil, but in order to make it as a feasible venture for farmers, Extension agencies particularly Sericulture Development Department (SDD), J&K has to play a major role in coordination with Central Silk Board in identifying the progressive farmers for establishing block plantations of mulberry and by conducting repeated training programmes so as to develop the skilled human resources. Perusal of the data obtained by rearing CSR double hybrid at Kargil revealed that as the traditional sericulture areas in the state of J&K are shrinking due to urbanisation and shifting to other Agricultural and Horticultural crops, it is essential to introduce sericulture to the unexplored areas of the state like Kargil as the present study has given positive indications regarding the success of sericulture in Kargil.

Table 2: Reeling results of silkworm double hybrid (FC2×FC1) reared at Kargil during 2017.

S.No.	Particulars	Lot 1	Lot 2	Lot 3
1	Defective cocoon (%)	6.75	6.94	6.42
2	Avg. Filament length (m)	910	899	878
3	Avg. Non-breakable length (m)	758	749	878
4	Avg. Filament denier	2.57	2.88	2.76
5	Reelability (%)	89	87	83
6	Raw silk (%) (on green cocoons)	12.23	11.93	11.94
7	Renditta on good cocoons (kg)	2.72	2.79	2.79
8	Renditta including defective cocoons (kg)	2.92	2.99	2.98
9	Raw silk recovery (%)	73.12	71.36	71.39

*Quantity of cocoons tested for reeling parameters in each lot = 1.13 kg

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