

**Research Article**

## **INTRODUCTION OF AUTUMN CROP IN SUB- TROPICAL KANDI AREAS OF PUNJAB**

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### **ABSTRACT**

Punjab is an advance state with good agriculture potential. Wheat, rice and cotton are major crops, which occupy about more than 90% of grass cropped area. However there are some semi irrigated and rainfed areas where small and marginal farmers with small land holding do not get adequate economics benefits from major agriculture crops. In these areas sericulture is practiced as a viable additional avocation. These areas fall under subtropical belt of Gurdaspur and Hoshiarpur. Farmers have been practicing silkworm rearing and upgrading of this technology, Sericulture Research centre of silk Board was established by Govt of India to facilitate the area. Recently second crop in autumn season was introduced to enhance annual economic return of sericulture. But most of the farmers do not opt for autumn crop mainly due to their engagement in Kharif crops operation, problem for space for rearing, fluctuation in crops in autumn and optimum price of cocoon. To solve these difficult problems we considered these three important issues related to Space, seasonal fluctuation in crops and cocoon price and studied factors related to autumn crops at farmers' level at Dhar Block of Pathankot Distt. Average yield was increased from 27.7 kgs/ ozs to 41.2 Kgs/ ozs and yield remain in between for last two years. However due to fluctuation in weather condition cocoon quality affected and farmers got low price in comparison to spring crop. The number of farmers motivated for autumn crop did not increase at respective level. Because of constraints such as high humidity, floor rearing unwillingness of farmers to prune plants in autumn crops ,such as paddy crop harvest, difficulties in drying of green cocoon in case of unassured marketing of the product . In tropical south India, silkworm rearing is practiced throughout the year and up to six crops are harvested annually. But in subtropical climate of north India, only one crop of silkworm cocoons is harvested mainly in spring season. The Kandi belt of Jammu province experiences sub tropical climate. Summers being very hot with drought like situation, make sericulture uneconomical. An effort was made to take up second rearing during the month of September in autumn season, by adopting a package of improved bivoltine cocoon production technology developed by the Institute over the years .Among the latest technologies introduced in the Kandi belt through Research Extension Centre, Barnoti, disinfection and chawki rearing were found to be most important for success of a second crop in autumn season. Environment as well through plantation of mulberry trees.

Looking into past years results ,it is suggested that date of brushing is to be prepond by 2 weeks and pruning of plant is to introduced at the onset of Monsoon this will enable farmers to get not only the quality leaf for rearing but also enable them to complete the crop before starting of paddy harvesting.

**Key Words:** *Cocoon, Mulberry Plant, Mulberry Varieties Namely 8-146, Chiness White and Mandalay and Autumn Crop*

### **INTRODUCTION**

Punjab has good quality agriculture potential. Wheat, Rice and Cotton are major crops, which occupy about more than 90% of gross cropped area. However, there are some semi- irrigated and rainfed areas where small and marginal farmers with small land holding do not get adequate economic benefits from major agriculture crops. In these areas, Sericulture is practiced as a viable additional avocation. These areas fall under sub- tropical belt of Pathankot and Hoshiarpur. Sub-tropical and temperate both climates exist with severe winters. Agriculture is almost rainfed. The climate of the pockets of plains and hills is very congenial particularly for sericulture. Farmers have been practicing silkworm rearing from many

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years under the supervision of Punjab State Sericulture Department. Majority of cocoon production of state is contributed by this district. Dhar sub- division alone contributes it's approximately 85% of total district production. Keeping in view of overall topography, climates features and socio- economic conditions of rural people of Dhar sub division, beside the area being agriculturally not very advanced, favors sericulture development. Traditionally silkworm rearing is practices once in a year during spring season by brushing of silkworm in the first week of March with Temp. 25 and relative humidity 80% rain 24mm. To increase the sericulture income of farmers from same plantation. Rearing of silkworm during autumn season has been introduced. Autumn season crop have been introduced. During autumn season, spring crop rearers not adopt autumn crop due to many reasons like the farmer do not have separate rearing house, practice of floor rearing. Mostly farmers do not prune mulberry plants in appropriate time for autumn crop. In sub tropical north India, silkworm rearing is traditionally practiced by the farmers in Kandi belt in spring season between March and April during the gestation period before the harvest of Ravi season Wheat crop (Gupta *et al.*, 2010; Pande *et al.*, 2012). In tropical south India, silkworm rearing is practiced throughout the year and up to six crops are harvested annually. But in subtropical climate of north India, only one crop of silkworm cocoons is harvested mainly in spring season. The Kandi belt of Jammu province experiences sub tropical climate. Summers being very hot with drought like situation, make sericulture uneconomical. An effort was made to take up second rearing during the month of September in autumn season, by adopting a package of improved bivoltine cocoon production technology developed by the Institute over the years. Among the latest technologies introduced in the Kandi belt through Research Extension Centre, Barnoti, disinfection and chawki rearing were found to be most important for success of a second crop in autumn season. Environment as well through plantation of mulberry trees (Pande *et al.*, 2012).

In the present work, efforts were made to take up an additional cocoon crop in the month of September, by the Introduction of improved mulberry varieties, new silkworm hybrids, and chawki rearing under controlled environmental conditions and by the use of disinfectants (Pande *et al.*, 2012).

Thus this study with objective of stability in cocoon production to make this crop as remunerative as traditional crop of spring season. Issue related to brushing, high humidity during rearing, time of pruning for mulberry plant to get quality leaf in autumn season and coincidence of kharif crop harvesting with autumn crop have been taken up for analysis and amendments for future stability and more return to farmers.

### **MATERIALS AND METHODS**

During autumn season rearing bivoltine silkworm was taken. The silkworm seed NB4DXSH6, RSJIXRSJ3 received from Dehradun and Udhampur was brushed during first week of September during experiment course. A total of 15 -16 ounce was used for chawki rearing and larvae were distributed amongst 32 to 37 reared every year after 3<sup>rd</sup> molting. Late age rearing was supervised at farmer's level where worms were reared on floor/ machan system of rearing (Khan and Saxena, 2000). For mounting of ripped worms, dry eucalyptus leaves were used as mountages. Harvesting of cocoon was effected on 6<sup>th</sup> day of spinning. During Chawakie rearing larvae were fed with quality leaves using mulberry varieties namely 8-146, Chiness White and Mandalays which were grown under bush system of cultivation. Whereas late age larvae at farmers level were fed on leaves of local varieties grown in the form of tree plantation under rainfed conditions. During Chawakie and late age rearing, recommended package of practices for mulberry cultivation, silkworm rearing and disinfection of rearing houses and rearing appliances were adopted as developed by sericulture centre of Pampore (Khan and Sexena, 2000; Dhar and Khan, 2002; Miransahib, 2002) for rearing of silkworm under sub –tropical condition (Dhar and Khan, 2002; Gupta *et al.*, 2010). Agriculture was uneconomical because of poor soils and low moisture content (Gupta *et al.*, 2010).

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### **RESULTS AND DISCUSSION**

The rearing performance of silkworm hybrids reared during autumn season is given in table 1. Whereas comparative performance of yield offspring and autumn season are presented in table 2. The % of frequency distribution amongst silkworm Rearers is presented in table 3. During autumn crop the range of cocoon yield in different years varied from 30.50 to 40 kg/oz in first year. It is evident from production that yield is ranging from 30–41 kg. The comparative performance of spring and autumn season in terms of cocoon production as given in Table 2 indicate that range of yield in different years in spring crops remained higher than the yield of autumn crops in all the years under study. The number of farmers and quantity of seed used in autumn crop is about one third of spring crop. The return per ozs. in spring crops is Rs. 3800, where as in autumn crop average return per ounce is lower than spring crop Rs. 2300.

The result of autumn crop rearing after three years have indicated that production of autumn crop is less than spring crop. In comparison of spring crop only 30% rearers could be involved in autumn crop rearing and that too after great motivation with better technological support. Productivity level of cocoon remained same but encouraging during experimental years. But productivity effected due to pre occupation of rearers with agriculture activities like Kharif crops harvesting and fodder collection for the cattle coupled with apprehension of rearers that if they go for autumn crop utilization the leaf shortage may occur in spring crop. Non availability of quality leaf remained one of the strongest constraints during autumn season. The leaf utilization by Rearers from their trees was over matured and was also effected by different pest and diseases as it is ascertained by other workers (Khan, 2006). Pruning of mulberry plants at appropriate time and shoot harvest technology developed by sericulture centre, Pampore if adopted by farmers may bring further improvement in cocoon yield (Dhar and Khan, 2002). Further high humidity inadequacy of rearing space, Ant attack are also some of factors –effecting yield of autumn crop, which I marks a negative impact on rearers. Hence the process of motivation to cover more rearers affected adversely. Thus low productivity resulted in low return per ounce generates lack of interest amongst rearers. Out of experience results and factors responsible for low yield, it is suggested to work out for appropriate brushing date by preponing it two weeks sale of green cocoon for good price and also provision of incentive on cocoon productivity in autumn crop.

**Table 1: Rearers Performance of autumn crop**

Sr.	Quality of seed	No. of Rearers covered	Actual crop Harvested	Av. Yield/OZs	Return Rs./OZs
1.	15.00	35	595	39	2335
2	16.50	37	680	41.20	2348
3.	14.50	34	510	35	2590

**Table 2: Frequency of cocoon yield of Rearers Percentage**

Yield range Kg. per Ozs	Ist year	II nd year	IIIrd year
0-10			
10-20			
20-30	10.81	8.11	2.86
30-40	48.65	45.95	62.57
40-50	35.13	32.43	22.86

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**Table 3: Reelability results of the bivoltine hybrids reared during autumn**

Silkworm hybrid	SH6 X NB4D2	RSJ3 X RSJ1
Filament length (m)	832	924
Non breakable filament (m)	730	755
Denier	2.87	2.5
Defective cocoon %	10.33	7.95
Renditta including defective cocoons	4.13	4.03
Renditta of good cocoons	3.63	3.59
Reelability %	81.7	84.0

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