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## Prevalence of silkworm diseases in subtropical zone of Jammu division, J&K, India

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### Abstract

A survey study was carried out in sericultural potential districts of Jammu division of J&K state during 2016 -17 to find out the prevalence of silkworm diseases during spring and autumn seasons. The average data recorded on percent disease incidence with respect to seasons indicated prevalence of 41.18 and 26.44 percent in autumn and spring rearing seasons with 29.94 and 18.73 percent grasserie and flacherie was 9.51, 6.73 percent whereas insignificant result for muscardine and no prevalence of pebrine throughout the period was found.

**Keywords:** Silkworm, disease, grasserie, flacherie, prevalence

### 1. Introduction

State of J&K having two distinct sericultural zones viz. temperate and sub-tropical based on agroclimatic conditions. Jammu and Kashmir is a bivoltine sericulture state having only two crops per year but its silk has outstanding quality on international level.

Success of sericulture industry mainly relays on quality mulberry leaves, quality of silkworm seed, optimum temperature and humidity and hygienic conditions. Silkworm rearing is the most sensitive operation involving risk of mortality due to diseases. The silkworm *Bombyx mori* L. is susceptible to various bacterial, fungal, viral and protozoan diseases. These diseases not only affect the silkworm health but may also cause crop failure at field level. Silkworm diseases are highly contagious and the causative agents get easily dispersed leading to outbreak of diseases.

With the advancement of improved rearing technology, release of package of practice for mulberry cultivation and use of bed disinfectants and chemicals for prevention of diseases and pests, it is possible to minimize the cocoon crop losses upto 15-20 percent.

Crop loss due to the incidence of diseases in autumn is one of the major problems faced by silkworm rearers in Jammu and Kashmir. Un-adequate hygiene during silkworm rearing, improper disinfection, un-adequate temperature and humidity and inferior quality of mulberry leaves are some of the main constraints resulting in incidence of disease outbreak. Keeping in view the above facts, a study was conducted to understand the prevalence of major silkworm diseases with respect to seasons in Jammu division.

### 2. Methodology

The present survey study was carried out at Kathua, Udhampur and Rajouri districts of Jammu during 2016 and 2017 spring and autumn season. Multistage sampling technique was used to draw random sample of 225 silkworm rearers from the study areas and observations were recorded as per the schedule prepared for the study. Diseased larvae depicting different microbial symptoms were collected and subjected to microscopic examination. The observations on prevalence of diseases were recorded by counting the number of diseased larvae out of total larvae reared in square foot from three random location of the rearing bed using the following formula:

$$\text{Disease prevalence} = \frac{\text{Number of diseased larvae}}{\text{Total number of larvae reared}} \times 100$$

The data were statistically analysed by using two-way ANOVA with interaction method in order to compare the average disease incidence.

**3. Results**

In the present study, among all the major diseases, grasserie and flacherie diseases were observed in all the three districts whereas muscardine in only Udhampur district. The results obtained are presented in Table 1 and Fig. 1-3.

**3.1 Season wise percentage of grasserie disease incidence**

Highly significant value of  $F=25.79^{**}$  was recorded for grasserie disease (Table 1). Maximum incidence of 32.46 percent grasserie disease was found in district Rajouri followed by Kathua (23.09%) whereas it was minimum in Udhampur (17.45%). Further, season wise incidence of grasserie disease (spring and autumn) was also highly significant ( $F=43.64^{**}$ ) recording maximum incidence during autumn (29.94%) and minimum in spring (18.73%). The interaction of season with respect to districts was found to be insignificant ( $F=1.70$ ,  $p\text{-value}=0.18$ ). During autumn, maximum grasserie disease percentage was recorded in district Rajouri (37.00) followed by Kathua (30.85) and during spring rearing season, minimum (12.92%) incidence was recorded in district Udhampur. The C.D. at 5% level of probability depicted that there is significant difference between seasons and districts mean.

**3.2 Season wise percentage of flacherie disease incidence**

The data pertaining to flacherie disease incidence per oz. seed recorded high significance ( $F=36.80^{**}$ ) with respect to three districts is presented in Table 1. The data on average flacherie disease incidence per oz. minimum in Udhampur (5.11%). In spring and autumn seasons, the disease incidence was also highly significant ( $F=22.97^{**}$ ) with maximum percentage of 9.51 in autumn and minimum 6.73 percent in spring. However, the interaction of season with respect to the districts

was insignificant ( $F=2.52$ ,  $p\text{-value}=0.08$ ). Maximum percentage of flacherie disease was recorded in Rajouri during both spring and autumn seasons ((12.32 & 10.33% respectively) and minimum in Udhampur (4.22%) during spring season. The C.D. at 5% level of probability depicted that there is significant difference between seasons and districts mean.

**3.3 Season wise percentage of muscardine disease incidence**

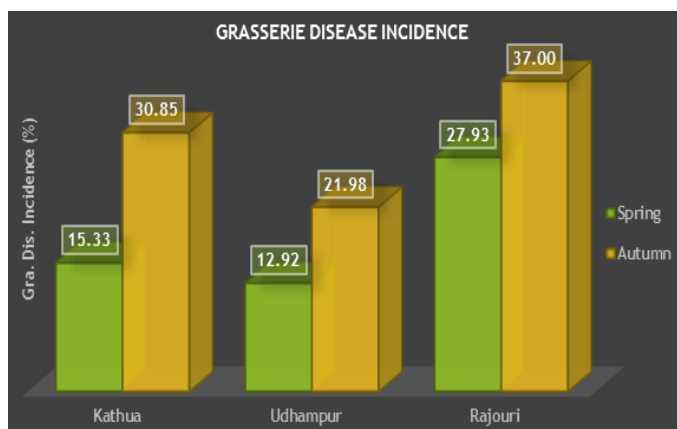
Insignificant results were recorded with respect to incidence of muscardine disease. It was recorded in district Udhampur only. Maximum incidence of 5.17 percent was observed during autumn and minimum of 2.93 percent during spring season.

**3.4 Season-wise overall percentage of disease incidence**

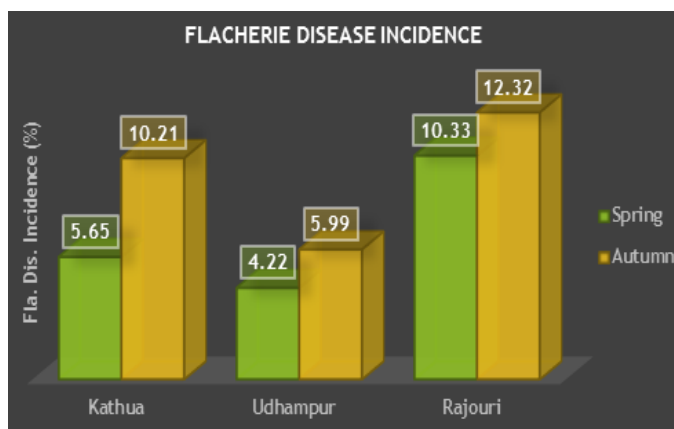
Highly significant ( $F=18.39^{**}$ ) results on overall disease incidence/oz. seed in three major cocoon producing districts of Jammu is presented at Table 1. The data on average disease incidence per oz. seed was maximum (43.79 percent) in district Rajouri followed by Kathua (31.02%) and minimum (26.61%) in district Udhampur. The incidence disease was highly significant ( $F=38.03^{**}$ ), maximum in autumn season with average value of 41.18 percent in comparison to spring (26.44%). The interaction of season with respect to districts was found to be insignificant ( $F=1.41$ ,  $p\text{-value}=0.24$ ). During autumn season, maximum percentage of disease incidence was recorded in district Rajouri (49.32) followed by Kathua (41.06%) and minimum in district Udhampur (20.07%). The C.D. at 5% level of significance depicts significant difference between seasons and districts mean.

**Table 1:** Mean comparison of disease prevalence (%) with respect to seasons

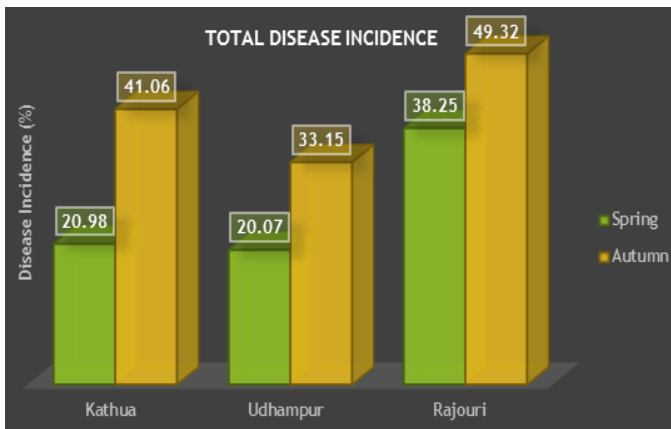
Season	Grasserie				Flacherie				Total disease incidence			
	Kathua	Udhampur	Rajouri	Mean	Kathua	Udhampur	Rajouri	Mean	Kathua	Udhampur	Rajouri	Mean
Spring	15.33	12.92	27.93	18.73	05.65	04.22	10.33	6.73	20.98	20.07	38.25	26.44
Autumn	30.85	21.98	37.00	29.94	10.21	05.99	12.32	9.51	41.06	33.15	49.32	41.18
Mean	23.09	17.45	32.46		07.93	05.11	11.32		31.02	26.61	43.79	
Factor	CD (5%)	F-value	(p-value)		CD (5%)	F-value	(p-value)		CD (5%)	F-value	(p-value)	
Season	1.34	43.64**	(<0.01)		0.46	22.97**	(<0.01)		1.89	38.03**	(<0.01)	
District	1.64	25.79**	(<0.01)		0.56	36.80**	(<0.01)		2.32	18.39**	(<0.01)	
Interaction	ns	1.70	(0.18)		ns	2.52	(0.08)		ns	1.41	(0.24)	



**Fig 1:** District and season-wise comparison of disease incidence



**Fig 2:** District and season-wise comparison of disease incidence



**Fig 3:** District and season-wise comparison of disease incidence

#### 4. Discussion

High prevalence of silkworm diseases in J&K stat was reported in autumn as compared to spring season by Selva Kumar *et al.*, (2002) [4]. Illahi and Nataraju (2007) [2] reported the prevalence of nuclear polyhydrosis in silkworm, in J&K in the range of 13.85 to 26.03 percent and the reasons included, improper disinfection, improper rearing house, lack of hygiene and lack of rearing expertise. Reddy and Rao (2009) [3] also reported maximum incidence of grasserie and flacherie in summer season as compared to winter. Balavenkatasubbaiah *et al.*, (2014) [1] also recorded more prevalence of grasserie disease during summer and flacherie and muscardine during winter season.

#### 5. Conclusion

From the above study it is concluded that there was significant seasonal difference on incidence of silkworm diseases, high (41.18%) during autumn as compared to spring season (26.44%) due to harsh climatic conditions and non-adoption of recommended package of practices specific to autumn season.

#### 6. References

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