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Investigation on Impact of Mycosis (Fungal Infection) on the Productivity of Mulberry Silk Worm

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ABSTRACT

The present investigation provides the effect of Mycosis (so called fungal infection) on the productivity and quality of cocoons of Mulberry silk worm.

1. Introduction

Sericulture is an integral part of rural economy in an agrarian country like India. It has tremendous potential in improving the economic status of rural people particularly tribal in India. In fact silk is gift of nature which is generally produced by phytophagous lepidopteran insects. Production of this fibreaptly known as “Queen of Textile” directly depends on the scientific practices of cultivation and protection of good plants and rearing the silk worm.

Intensive investigation[1,2,4,6-8] have been carried out in the field of mulberry sector for improving the productivity and quality of mulberry silk produced by Bombyx-mori. Among the different factors affecting the productivity and quality of mulberry silk, the impact of diseases has been found to be very serious[10,11]. Four types of diseases namely sporozoasis (pebrine), virosis, backteriosis and mycosis have been found to affect the quantitative and qualitative characters of mulberry silk. Some other works in this field are[3,5,9,12]. However, we shall investigate the impact of mycosis on the productivity of mulberry silk.

2. Material and methods

Female moths of Mombyx-mori suffering from mycosis so called fungal infection were considered for the present parameter of the project. The female moths were allowed for the egg laying and there after a lot of 250 eggs divided into five replications (50 x 5) were put at incubation temperature 26^{o}C ±1 till hatching of larvae. The eggs as were collected. The newly hatched larvae were brushed on the foliages of mulberry plant till cocoon formation stage. The experiment was carried out for both the seasons of rearing. A control was also maintained for the relative evaluation between diseased and non-diseased conditions. The data in relation to productivity, cocoon volume, cocoon weight, shell weight, shell ratio, filament length and denier were collected and recorded in the tables.

3. Observation

The impact of mycosis on the productivity and quality of mulberry silk during the seed crop and commercial crop seasons have been evaluated and the results so obtained have been presented in the table 1 and 2.

Table 1 reveals that the percentage of E.R.R. (18.0), volume of cocoon (11.0 cc), cocoon weight (4.95gms), shell weight (0.70 gms), shell ratio (9.91%), filament length (520 mtrs) and the denier (3D) are inferior to its control during the seed crop seasons. The percentage of E.R.R. (26.0), volume of cocoon (11.32CC), cocoon weight (5.95gms), shell weight (0.78 gms), shell ratio (9.95%), filament length (590 mtrs) and denier (3D) of control lot are by and large superior than the mycosis lot. The E.R.R. percentage and filament length have been found to be highly significant when the mycosis lot and the control lot are being compared. Likewise the volume of the cocoon and cocoon weight are also significant. No significant differences have been observed in relation to shell weight, shell ratio and denier between the two lots of the seed crop season.

Table 2 accounts for the impact of mycosis on the productivity and quality of mulberry silk during the commercial crop season. The percentage of E.R.R. (20.0), volume of cocoon (11.13CC), cocoon weight (510 gms), shell weight (0.74 gms), shell ratio (9.98%), filament length (529 mtrs) and denier (3D) are evidently inferior than its control. The percentage of E.R.R. (28.0), volume of cocoon (11.81CC), cocoon weight (592 gms), shell weight (0.85gms), shell ratio (10.10%), filament length (610 mtrs) and denier (4D) of the control lots are superior to mycosis lot of the commercial crop season. When the mycosis lot is compared with the control lot, the percentage of E.R.R., shell weight and filament length have been found tobe highly significant.

Similarly the volume of the cocoons and the cocoon weight are also significant. No significant differences have been observed in the respect of shell ratio and denier between the mycosis lot and the control lot.

Table – 1

Table showing impact of mycosis on the productivity of mulberry silk worm during the seed crop season.

Repli-cation	No. of worms mounted	E.R.R. (%)	Cocoon volume (CC)	Cocoon weight (gm)	Shell weight (gm)	Shell ratio (%)	Filament length (mtr)	Denier of fibrine
1.	50	18.0	11.0	4.95	0.70	9.91	520	3D
2.	50	17.0	12.0	4.96	0.71	9.93	519	3D
3.	50	19.0	11.0	4.94	0.72	9.92	521	3D
4.	50	16.0	10.0	4.93	0.69	9.92	522	3D
5.	50	19.0	12.0	4.96	0.68	9.94	520	3D
Av.	50	18.0	11.0	4.95	0.70	9.91	520	3D
Control	50	26.0	11.32	5.95	0.78	9.95	590	3D
C.D. at 0.5% level for character		**	*	*	NS	NS	**	NS

** : Highly significant
* : Significant
NS : Not significant

Table – 2

Table showing impact of mycosis on the productivity of mulberry silk worm during the commercial crop season.

Repli-cation	No. of worms mounted	E.R.R. (%)	Cocoon volume (CC)	Cocoon weight (gm)	Shell weight (gm)	Shell ratio (%)	Filament length (mtr)	Denier of fibrine
1.	50	20.0	11.3	5.10	0.74	9.98	529	3D
2.	50	19.0	11.15	5.12	0.74	9.97	530	3D
3.	50	21.0	11.14	5.09	0.73	10.01	528	3D
4.	50	21.0	11.12	5.08	0.76	9.99	528	3D
5.	50	18.0	11.10	5.13	0.76	9.98	530	3D
Av.	50	20.0	11.13	5.10	0.74	9.98	529	3D
Control	50	28.0	11.81	5.92	0.85	10.10	610	4D
C.D. at 0.5% level for character		**	*	*	**	NS	**	NS

** : Highly significant
* : Significant
NS : Not significant

4. Discussion and conclusion

The fungus involved in the mycosis of silk insects has been identified as *Pencilliumcitrinum*. The typical penicillius consists of cluster of metulae often of somewhat different length, each bearing a compact group of phialides and appearing vertical of the verticillatre heads. The hyphae are well developed more or less cottony masses hyaline sepate, not on stroma, distinct from conidia smoth and 2.5-3.0μ diam. The Phialides are crowded and 8-11 x 2.24μ diam capture catenate, and packed in nucleate, 2.5-3μ diam capture catenate and packed in solid divergent columns. Metulae are club shaped 14-16μlength and 4.8μ in breadth at its broadest extremity.

Another kind of green mycosis revealing the same symptoms has been detected in non-mulberry insects. The spores of this fungus are oval in shape. No information is available regarding the causative agent of the mscaradine of *Antheraea*species. The fungus involved in the traumatism of *Antheraeapernyi* is asperillusflauvs.

In an Anthereamylitta rearing the estimated crop loss of diseases is to the extent of 40%. Polyhedrosis and mycosis are 15 and 5% respectively. Among the bacterial diseases the incidence of SAL is highest (8%), whereas 'CTE' ranks next (5%) and other ranks next (5%). The lowest damage has been recorded with RP (2%).

The mycosis in silk insects has been found to occur during the early period of the second rearing season (September) and is observed rarely during the first season. The appearance of microsporidiosis in *Antheraea*species is sporoadic. Once the epidemy spreads in an area the loss may go upto any extent depending upon the degree of infection. The same holds true for *Anthereapernyl*, *Antheraeaassamensis* and *Antheraeayamamai.*

5. Summary

It has been found that the mycosis causes relatively lesser harm to mulberry insects than sporozoasis, bacteriosis and virosis. Due to mycosis the productivity gets affected to some extent. Very little deterioration in respect of quality of cocoons and silk yarn has been observed. As a matter of fact mycosis is caused by fungal infection. It is reported that the pathogen causing mycosis among the silk insect has relatively the lesser potential to cause the harm to silk worm. So it has minimum harmful effect in comparison to three other diseases of silk insects. Moreover the nature of pathogen and mode of infection caused by the fungus in respect of mycosis appears to be mildinforms as a result lesser deterioration in respect of

productivity and quality of mulberry cocoons have been noticed. The said fact permits us to accept the result obtained. Further seasonal variations in respect of productivity and quality of cocoons have been obtained commercial crop season is relatively better than the seed crop season.

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