



Relative Effects of Muscardin and Flacherie Diseases on the Biochemical Contents of Larvae Pupae and Adult Mulberry Silkworm in Relation to Different Seasons

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Abstract

The impact of muscardin and flacherie disease on the biochemical contents at larval, pupal and adult stages of *bombyx mori* have been examined during the seed crop and commercial crop season, which accounts for the seasonal differences. Table 1 and 2 have shown that the commercial crops has registered its supremacy over seed crop seasons as far as the concentrations of the biochemical contents like free amino acids, Protein, lipid, carbohydrate, moisture and ash at different stages of life cycle of *Bombyx mori* in respect of said disease. It appears that the commercial crop season provides better dietary and climatic condition to mulberry silkworm than the seed crop season.

Keywords: *Bombyx mori*, season, parameters, Muscardin, flacherie.

Introduction

Today the sericulture world is divided into mulberry sector and non mulberry sector. The mulberry sector mainly includes *Bombyx mori* feeding on the foliage of mulberry plants under domesticated conditions. *Bombyx mori* is famous for producing beautiful silk of great commercial value. The mulberry insect has the stages like eggs, larvae, pupae and moths in their gradual development. It has five level feeding stages where the larvae grow on chopped foliage supplied during the course of rearing. The rearing is carried out during the larval period, which is a very important factor for the commercial exploitation of the cocoon and better silk yarn. It is known that the quality of the silk depends on many factors namely environmental condition, soil profile, quality of foliage, seasonal changes, attacks of predators and diseases. It has been observed during the process of mulberry silk worm rearing that it suffers great loss of crop (20-30 %) due to disease like pebrine, virosis, muscardin and flacherie as a result the productivity and quality of mulberry silk evidently get affected. Due to species diversities of pathogens causing in the extent of harms made by the pathogens are also reported by earlier investigators¹.

It is further known that the disease of silk worm impairs the growth and development by affecting the biochemical manifestations. It appears that the pathogens with their diverse nature affect the biochemical concentration such as carbohydrate, protein, lipid, free amino acid and also percentage of moisture and ash contents of silk worms during the pathological manifestations. In recent days the biochemical studies of some silk producing insects have been carried out². Above project has been designed which aims at understanding the impact of different diseases (Muscardin and flacherie) of

Bombyx mori on its biochemical make up during the different stages of its life cycle.

Material and Methods

The different stages of mulberry silk worm namely larvae, pupae and moths infected with two types of diseases were collected from the rearing sites during the seed crop and commercial crop seasons. The stages of the infected mulberry silk worm were identified with the help of the symptoms as worked out³. The entire study in relation to the biochemical investigation in respect of free amino acid, carbohydrate, protein, lipid, moisture and ash contents were carried out as per the standard methods. The entire work during both the seasons in respect of biochemical contents of the diseases of silk worm were carried out in the P.G. deptt. of Zoology, Magadh university Bodh-Gaya, Bihar. The data were collected, compared and finally presented in the table 1 and 2.

Results and Discussion

As a matter of fact the silk producing insect suffers great loss of crop due to various diseases like flacherie, virosis, sporozoosis and muscardin. The muscardin and flacherie diseases caused by fungal and bacterial infection are very prominent among the mulberry silkworm. It retards the growth and development of a silkworm as a result. The length and width of the worm get affected as well as metabolic activities.

The relative impacts of muscardin and flacherie diseases on the biochemical contents of the larvae, pupae and moths of *Bombyx mori* in relation to the seed crop and commercial crop seasons have been examined and presented in the table 1 and 2. Table 1 reveals that the numbers of free amino acid in the larvae, pupae

and moth of muscardin infected lot during the seed crop seasons, which is 15, 16 and 18. where as during the commercial crop seasons it is 17, 18 and 19. The percentage of carbohydrate has been found to be 6.13, 6.57, 6.57 during the seed crop seasons and it is 6.57, 6.73 and 6.63 during the commercial crop season. The percentage of protein at three stages of life cycle during the seed crop season has been found to be 40.40, 42.15 and 46.13 and 41.65, 42.63 and 46.94 during the commercial crop season. Similarity the percentage of lipids during the seed crop season is 15.40, 14.32 and 12.16. It is 15.71, 14.66, 12.44 during the commercial crop season. The percentage of moisture has been found to be 50.64, 55.13 and 50.12 during seed crop season and it is 51.37, 55.66 and 50.22 during the commercial crop season. Finally the percentage of Ash at three stages of life cycle of *Bombyx mori* during the seed crop season is 5.46, 6.13 and 7.12 and it is 5.54, 6.55 and 7.14 during the commercial crop season. From the table it is very clear that the commercial crop carry greater number and percentage of biochemical contents during the commercial crop seasons than the seed crop season, which accounts for the seasonal differences of biochemical contents in relation to the short worm disease.

Like wise in Flacherie infected mulberry silk worm, the chemical contents of larvae, pupae and adult of *Bombyx mori* also shows deterioration in respect of biochemical content in respect of free amino acid (13.15 and 15) percentage

carbohydrate (5.19, 5.90 and 6.11) protein (38.54, 41.48 and 43.28), lipid (13.28, 12.68 and 10.59) as per the table 1 and it highly significant. The percentage of moisture at larval (48.48) pupal (54.45) and adult (48.21) shows increase percentage with Flacherie infected lot as compared to normal condition. The percentage of moisture at larval (4.34) pupal (5.53) and adult (6.90) also show deterioration of biochemical concentration. It follows the similar trend during the commercial crop season as per table 2. The notable investigations in the field of biochemistry of silk worm have been carried out⁴ which is supported by other researchers⁵⁻¹⁵.

Finally when we summed up the discussion it becomes very clear that muscardin disease caused by fungal infection and flacherie disease caused by bacterial infection among the mulberry silk worm (*Bombyx mori*) significantly effect the biochemical contents particularly free amino acids, Carbohydrate, lipid and protein resulting in to poor growth and development of larval, pupal and adult stages of *Bombyx mori* during both the seasons. The relative impacts of two disease namely muscardin and flacherie of *Bombyx mori* has greater pathological effect on the biochemical make up of mulberry silkworm at different stages of life cycle than the muscardin disease which is evident from the relative deterioration of biochemical contents recorded during the course of investigation.

Table-1

Showing relative effect of two diseases on the biochemical Contents of Larvae, Pupae and adult of *Bombyx mori* during seed crop season

S.N	Biochemical Parameters	Larvae		Pupae		Moth		CD at 5% Level for Characters
		M	F	M	F	M	F	
1.	No. of free amino acids	15	13	16	15	16	15	**
2.	Carbohydrate (%)	6.13	5.19	6.57	5.90	6.57	6.11	**
3.	Protein (%)	40.40	38.54	42.15	41.48	46.13	43.28	***
4.	Lipid (%)	15.40	13.28	14.32	12.68	12.16	10.59	**
5.	Moisture (%)	50.64	48.48	55.13	54.11	50.12	48.21	**
6.	Ash (%)	5.46	4.34	6.13	5.53	7.12	6.90	**

** – Significant, *** – Highly Significant, M – Muscardin, F – Flacherie

Table-2

Showing relative effect of two diseases on the biochemical Contents of Larvae, Pupae and adult of *Bombyx mori* during Commercial crop season

S.N	Biochemical Parameters	Larvae		Pupae		Moth		CD at 5% Level for Characters
		M	F	M	F	M	F	
1.	No. of free amino acids	17	16	18	17	17	16	**
2.	Carbohydrate (%)	6.57	5.13	6.73	6.23	6.63	6.24	**
3.	Protein (%)	41.65	39.41	42.63	42.27	46.94	44.39	***
4.	Lipid (%)	15.71	14.86	14.66	12.92	12.44	11.27	**
5.	Moisture (%)	51.34	48.41	55.66	54.16	50.22	48.91	**
6.	Ash (%)	5.34	4.44	6.55	6.20	7.14	6.94	**

** – Significant, *** – Highly Significant, M – Muscardin, F – Flacherie

Conclusion

The finding of the above experiment as shown in the table 1 and 2 clearly shows that irrespective of the season Flacherie disease is more harmful for the moths of different stages in causing damage to the biochemical contents of varied categories than that of the Muscardin and is more damaging to the economy of silk Industries than muscardin thus affects the economy of nation.

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