



## LEVEL OF SEASON BASED OCCURRENCE OF MUSCARDINE DISEASE, IN BOMBYX MORI, COLLECTED FROM SELECTED DISTRICT OF VIDARBHA, MAHARASHTRA

### Biological Science

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### ABSTRACT

Pathogens like viruses, bacteria, fungi and protozoan attacks silkworm differently during different seasons, causing corresponding diseases. Fungal diseases of Silkworm are called Muscardine. In present paper Season wise survey was conducted during 2011-12 on occurrence of Muscardine in Akola, Amravati, Buldhana, Washim and Yavatmal districts of Vidarbha regions in Maharashtra. We reported that in monsoon season the spread of Muscardine in Akola district during Year 2011-12 was found to be 1.79 %, in Amravati 1.53 %, In Buldhana it was 1.24 %, in Yavatmal was 1.43 % and in Washim district was reported to be 1.31 %. Muscardine prevalence in post monsoon season in Akola district during Year 2011-12 was found to be 4.17 %, in Amravati 4.26 %, In Buldhana was 4.38 %, in Yavatmal was 4.47 % and in Washim district was reported to be 3.17 %. The appearance of Muscardine in winter season in Akola district during Year 2011-12 was found to be 18.34 %, in Amravati 18.17 %, In Buldhana was 18.34 %, in Yavatmal was 17.23 % and in Washim district was reported to be 16.32 %. In spring season, the incidence of Muscardine in Akola district during same Year was found to be 1.34 %, in Amravati 0.65 % percent, In Buldhana was 0.34 %, in Yavatmal was 1.47 % and in Washim district was reported to be 1.53 %. This observation of the Muscardine infections in silkworm leading to mortality and great economic loss, calls for renewed emphasis on the preventive measures for disease control.

### KEYWORDS

Muscardine, Fungal Infection, Bombyx mori, Aspergillosis, Vidarbha.

### INTRODUCTION

Occurrence of diseases is one of nature's methods of quickly checking the overproduction of a species, and for the balance of seasonal biodiversity. All species of animals, including man, and insects have their own specific seasonal diseases, which usually emerge at the time a species becomes so abundant in a particular phase of year, that it may menace the affluence of the coming generations (Rane, 1911). Disease occurring seasonally, also affects silkworm, the Bombyx mori during all its developmental stages (Nagaraju, 2002) As it the insect is easily susceptible to variety of pathogenic and nonpathogenic seasonal infection. In the silkworm rearing centers of Vidarbha region continuous rearing of silkworms year after year also leads to perpetuation of pathogenic diseases like Grasserie, Flacherie and Muscardine. Viruses, bacteria, fungi and protozoan (Abir et al., 2013) attacks silkworm differently during different seasons, causing related diseases, causing great economic loss to the growers.

Fungal diseases of Silkworm are called Muscardine which is characterized by the mummification of the infected larvae till and after death. Different infesting fungi produce different colored spores and accordingly causing White Muscardine, Black Muscardine, Yellow Muscardine, Red Muscardine, etc.

According to Reddy and Rao (2009) ninety per cent of Muscardine infection occurs by penetration through the cuticle and the rest 10 per cent alone occurs through the mouth or through the spiracles. Infected larvae show loss of appetite, lag in growth, shrinkage of body, oil specks and spots on the skin, diarrhea, and vomiting and early instars larvae are affected and die before spinning or at pupal stage. According to Nirupama (2014) Beauveria bassiana is one of the fungi causing white Muscardine, which is common in all sericulture zones of the world. In silkworm and other lepidopterans, the Muscardine infection remains confined to the haemocoel attaching and/or destroying and denaturing the haemolymph and fat body cells prior to death (Rajitha et al., 2013).

### MATERIAL AND METHOD

The present work was carried out in some of the selected silkworm rearing districts of Vidarbha region which is known since ancient times for its rich and fertile soil, situated in central India, located right at the heart of Indian union occupying 45868Sq. Km. area between 19° 05' to 21° 47' North latitude and 75° 59' to 79° 11' East longitude. It occupies 31.6% of total area and holds 21.3% of total population of Maharashtra.

Though Western Vidarbha region in Maharashtra is known as cotton producing region, nowadays farmers in Amravati, Akola, Yavatmal, Buldhana, and Washim districts are diverted in opting rearing of

mulberry silkworm, using CSR2 and Kolar gold breeds of silkworm Bombyx mori, and taking commercial crops of silk round the year.

With reference to the silkworm rearing, the period of a year divided into four seasons depending on the temperature, relative humidity and rainfall. They include Monsoon, Post monsoon or autumn season, winter season and spring season.

Monsoon or rainy seasons is from July-September, it is characterized by moderately high temperature high humidity and moderate to heavy rainfall. Post monsoon or autumn season is from October to November, it is characterized by moderate humidity sparse rainfall and moderately low temperature, 12° to 24° C. Winter season is from December to February. It is characteristic by chilly weather very low humidity and no rainfall. Spring season is from March to April characterized by rising temperature, and hot up to 40°-42°C and dry climate.

With due consent of the farmers, the study area was surveyed and the information of the leading commercial silk growers located in the study district of Amravati, Akola, Yavatmal, Buldhana, and Washim was collected with the help of concern sericulture centers. As many as 250 silkworm rearing centers located in various villages were surveyed, in the study districts, for incidence of seasonal diseases on CSR2 hybrid races of silkworm Bombyx mori. The study continued complete annual cycle, during year 2011-12. The experimental survey was done following the method of Bontha Kasi Reddy and Krishna Rao (2009). All the centers were visited during Monsoon, Post monsoon or autumn season, winter season and spring season. Silkworm infected with disease, often manifest characteristics symptoms and signs of diseases, hence the identification of worms infected with the diseases in the fields initially was made on the basis of gross pathology. This identification was done during development at fifth instars larval stage and Muscardine and others diseases are diagnosed by external examination at the rearing centers.

During every visit, prevailing ambient temperature and relative humidity was determined and recorded. Silkworm larvae were observed for disease if any in 10% of the rearing trays randomly during 5th instars (3rd to 5th day), by morphological and microscopic examination. The number was recorded throughout the rearing period in different seasons. The observations on occurrence of Muscardine were reported by recording the number of healthy and diseased larvae during the course of rearing and the incidence percentage for the disease was calculated by using the following formula:  $X = (100 \times Y) / Z$  (1)

(Where X = prevalence of Disease (%); Y = total diseased larvae; Z =

Total number of larvae.)

**RESULT AND DISCUSSION**

Season wise survey was conducted during the year, 2011-12 spread of Muscardine in Akola, Amravati, Buldhana, Washim and Yevatmal districts of Vidarbha regions in Maharashtra.

White Muscardine as reported in the studied districts is caused by a fungus *Beauveria bassiana* and the Green Muscardine is caused by a fungus *Spicaria prasina*. In the larvae infected with Muscardine, Aspergillosis is observed in young age silkworms. The diseased larvae appeared lethargic. On the surface of some infected larvae, oil specks are also observed. Which gradually become hard, dry and mummify into a white or green colored integument. The larvae soon died and on death, the carcass appeared flaccid (Photo plate).

The survey reported that the common breed of silkworm in the study area is dominated by CSR2 and by Kolar gold in summer and its incidence and prevalence in Vidarbha region is as follows (Table).

As depicted in the table, in monsoon season the incidences of Muscardine in Akola district during Year 2011-12 was found to be 1.79 %, in Amravati 1.53 %, In Buldhana was 1.24 %, in Yevatmal was 1.43 % and in Washim district was reported to be 1.31 %.

Muscardine prevalence in post monsoon season in Akola district during Year 2011-12 was found to be 4.17 %, in Amravati 4.26 %, In Buldhana was 4.38 %, in Yevatmal was 4.47 % and in Washim district was reported to be 3.17 %.

The incidences of Muscardine in winter season in Akola district during Year 2011-12 was found to be 18.34 %, in Amravati 18.17 %, In Buldhana was 18.34 %, in Yevatmal was 17.23 % and in Washim district was reported to be 16.32 %.

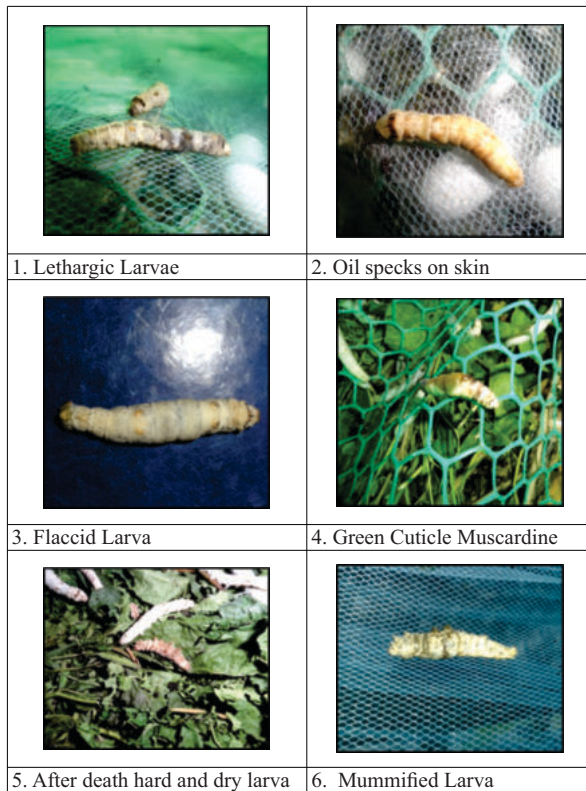
In spring season, the incidences of Muscardine in Akola district during same Year was found to be 1.34%, in Amravati 0.65% percent, In Buldhana was 0.34 %, in Yevatmal was 1.47 % and in Washim district was reported to be 1.53 %.

According to the recorded data, during 2011-12 the seasonal incidence of Muscardine on silkworm was reported in the study districts of Vidarbha region which varied seasonally during the study year. The data revealed that Muscardine was observed high in winter season in all the districts and rarely in rainy season. This is in accordance to the same pattern, reported by Reddy and Rao (2009) in the border state of Andhra Pradesh. In corroboration with their findings during rainy and summer seasons of studied period 2011-12, incidence of Muscardine was low.

In winter season, the incidence of Muscardine was highest is also reported by Etebari et al., (2007) and Chandrasekharan, (2009) who surveyed and reported similar type of incidence of seasonal diseases in the commercial silkworm crops respectively. Nirupama (2014) also claimed that there is a greater variation in environmental conditions especially during rainy and summer seasons which are dominated by, the temperature and water vapors in the atmosphere and it might be the cause of the incidence of Muscardine infections during these seasons. According to Anonymous (1975) in Karnataka, Muscardine occurrence is extremely high in winter season, but Mukherji (1912) and claimed in West Bengal it was high in rainy season, also supported by Nirupama (2014).

According to Miyajima (1978) winter conditions in central India are dry and more suitable for fungal growth; therefore, encourage the spread and transmission of fungal infections causing Muscardine. Accordingly, in the present study too Muscardine infection during the studied year was reported higher during winter season, which become very much reduced during rainy season and reported lacking during summer. This observation of the Muscardine infections causing silkworm mortality and economic loss to the farmers calls for renewed emphasis on the preventive measures for disease control. As suggested by Bhat Aina. (2021), management with botanicals is eco-friendly and can be acceptable to the farmers who can utilized these agents successfully in the management of Muscardine *Bombyx mori* disease of silkworm depending on their local availability in the area.

**Photo Plate: Muscardine Infected Larvae**



**Table. (%) Seasonal Occurrence Of Muscardine On Mulberry Silkworm In Vidarbha Region Of Maharashtra.2011-12**

Seasons → District ↓	Monsoon	Post monsoon	winter season	spring season
Akola	1.79	4.17	18.34	1.34
Amravati	1.53	4.26	18.17	0.65
Buldhana	1.24	4.38	18.34	0.34
Yevatmal	1.43	4.47	17.23	1.47
Washim	1.31	3.17	16.32	1.53

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