

Seasonal incidence of pathogenic disease Grasserie in silkworm *Bombyx mori* in Vidarbha region (Maharashtra)

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Abstract

The survey of Grasserie diseases of silk worm was carried, during the year 2010-11, and 2011-12 through 5 districts (Akola, Amravati, Buldhana, Washim and Yevatmal) of Western Vidarbha regions in Maharashtra. As many as 250 silkworm rearing centers located in various villages. The incidence of Grasserie varies seasonally. During Both study year 2010-11 and 2011-12 the incidences of Grasserie in monsoon season was higher. The district wise incidence during 2010-11 in Monsoon was reported as, Akola 7.65%, Yevatmal 7.28 % Amravati 7.12 Washim 6.82% Buldhana 6.61%. in post monsoon it was, Washim 6.1% Akola 5.78% Amravati 5.12% Buldhana 4.98 % Yevatmal 4.21%, in winter season it was recorded as Yevatmal 7.01% Buldhana 6.75 % Akola 6.63% Amravati 6.12% Washim 5.71 and in spring season the incidences of Grasserie was reported as Amravati 7.51% Akola 7.23% Buldhana 7.12% Yevatmal 7.11% Washim 7.08% During 2011-12 the incidences of Grasserie in monsoon season reported as Amravati 7.64 % Akola 7.42% Yevatmal 7.31% Buldhana 6.44% Washim 6.49%, in post monsoon season was as Washim 6.32% Amravati 5.75% Akola 5.64 Buldhana 4.75% Yevatmal 4.47% winter season was Yevatmal 7.12% Akola 6.32% Amravati 6.24% Buldhana 6.17 Washim 5.47% and in spring season was Amravati 7.75% Buldhana 7.57% Akola 7.21% Washim 7.24% Yevatmal 7.17.

The silkworm, *Bombyx mori* is a purely domesticated insect since 4,500 years but like other domesticated animals it is a quite delicate venture and might be easily susceptible to a number of diseases, most of which develops seasonally^{6,9}. Seasonal occurrence of disorders and diseases is a periodic surge in disease incidence, corresponding to seasons or other calendar periods. All 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 menace the affluence of the coming generations¹¹.

Grasserie is one of the most serious diseases in tropical countries, though occurs throughout the year, intensity varied with seasons. It is also known as the 'hanging disease'. *Borrelina Bombycis* virus, of the family Baculoviridae causes this disease. The Baculoviridae comprises only 2 genera

nucleorpolyhedorsis virus (NPVs) and granulovirus (GVs). In this infection the virus multiplies and forms polyhedra in the nucleus of infected cells. Infection mainly takes place through wounds and feeding of polyhedral contaminated mulberry leaves. The high temperature, humidity and their sudden fluctuation, bad ventilation, ineffective disinfection of rearing house and rearing appliances, starvation and inadequate larval spaces as well excessive moisture in the rearing bed affect spreading the disease. Though Vidarbha region in Maharashtra is known as cotton producing region, nowadays farmers in many areas, 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 but also regularly facing the problems of incidence of various pathogenic diseases including Grasserie. This disease has never been studied and reported before, particularly from the Western Vidarbha region, in Maharashtra.

With due consent of the farmers in Akola, Amravati, Buldhana, Washim and Yevatmal districts of Western Vidarbha regions in Maharashtra, season wise survey was conducted during the year 2010-11, and 2011-12 and the information of the leading commercial silk growers located in the study districts, was collected with the help of concern district sericulture center. As many as 250 silkworm rearing centers located in various villages were surveyed, in the study districts, for incidence of disease in silkworm *Bombyx mori*. 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 disease, hence the identification of worms infected with the Grasserie disease in the fields initially was made.

The incidence of Grasserie is reported in the silkworm rearing areas of all the studied districts of Vidarbha region, throughout the year 2010-2011 and Year 2011-12. The result of survey during the present work reported that the common breed of silkworm in the study area is dominated by CSR2 and by Kolar gold in summer, and reported that the major infectious disease of the silkworm namely, Grasserie infect the silkworm in all commercial crops from studied districts. The larvae infected with Grasserie in the rearing centers were found to be slightly sluggish. Initially the skin shows oily and shining appearance with progress of infection, skin becomes thin and fragile and the midgut appeared milky white with inter-segmental swelling (Photo plate I). Rupture of the fragile skin observed liberating the liquefied internal organs containing numerous numbers of polyhedra. The observed larvae appeared restless and crawl aimlessly out of the rearing trays they found to be dead about after 5 – 7 days in the fifth instar stage.

The incidence of Grasserie varies in different districts of Western Vidarbha region. During year 2010-11 (Table 1 and Fig. 1). the incidences of Grasserie in monsoon season were high. The district wise incidence was **Akola >Yevatmal >Amravati >Washim >Buldhana**. During post monsoon the incidences of Grasserie, Washim >**Akola >Amravati >Buldhana >Yevatmal**. Similarly in winter season the incidence was recorded as **Yevatmal >Buldhana >Akola >Amravati**

Photo plate. I: Grasserie infected larvae:



1. Infected larva with oily and shiny skin



2. Larva with swollen intersegments and sluggish appearance



3. Larva with thin and fragile integument



4. Larva hanging upside down



5. Milky white integument ruptured skin



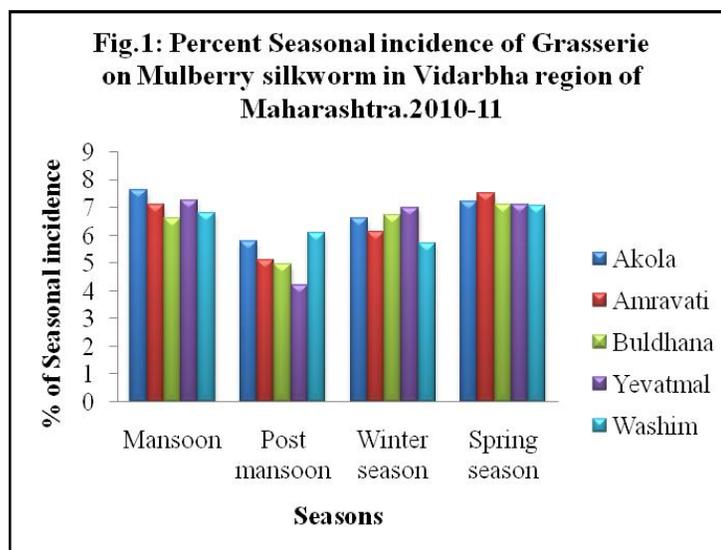
6. Polyhedral bodies oozing out of midgut

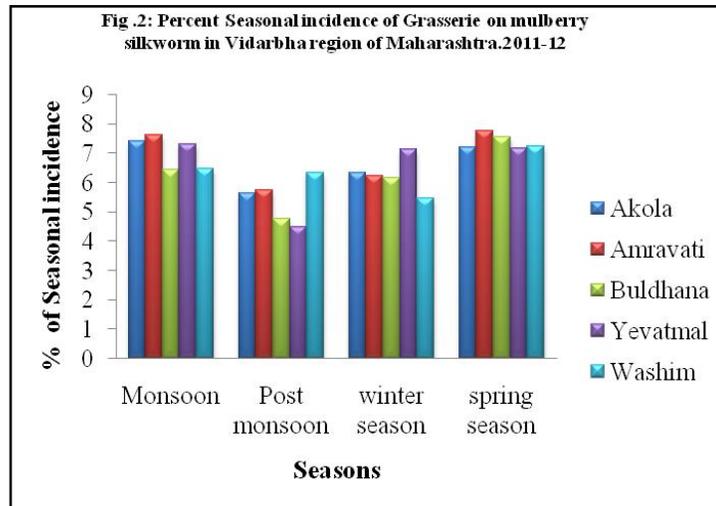
Table-1 (%) Seasonal incidence of Grasserie on Mulberry silkworm in Vidarbha region of Maharashtra 2010-11

Seasons → District ↓	Monsoon	Post monsoon	winter season	spring season
Akola	7.65	5.78	6.63	7.23
Amravati	7.12	5.12	6.12	7.51
Buldhana	6.61	4.98	6.75	7.12
Yevatmal	7.28	4.21	7.01	7.11
Washim	6.82	6.1	5.71	7.08

Table 2. (%) Seasonal incidence of Grasserie on mulberry silkworm in Vidarbha region of Maharashtra 2011-12

Seasons → District ↓	Monsoon	Post monsoon	winter season	spring season
Akola	7.42	5.64	6.32	7.21
Amravati	7.64	5.75	6.24	7.75
Buldhana	6.44	4.75	6.17	7.57
Yevatmal	7.31	4.47	7.12	7.17
Washim	6.49	6.32	5.47	7.24





>**Washim**. In spring season the incidences of Grasserie was reported as **Amravati > Akola > Buldhana > Yevatmal > Washim**.

During survey year 2011-12 too (Table 2 and Fig. 2), the incidence of Grasserie is reported in the silkworm rearing areas of all the studied districts of Western Vidarbha region. The data depicted that the incidences of Grasserie in monsoon season (2011-12) was high and reported as **Amravati > Akola > Yevatmal > Buldhana > Washim**. The prevalence of Grasserie in post monsoon season was recorded as **Washim > Amravati > Akola > Buldhana > Yevatmal**. The prevalence of Grasserie in winter season was found as **Yevatmal > Akola > Amravati > Buldhana > Washim**. In the same year the incidences of Grasserie in spring season too higher, which was **Amravati > Buldhana > Akola > Washim > Yevatmal**.

In monsoon and spring seasons, higher incidence of Grasserie is reported in all the studied districts, which is according to Etebari

et al.,⁴ and Chandrasekharan,² who too reported similar type of incidence of Grasserie, in the commercial silkworm crops. They also claimed that there is a greater variation in environmental conditions especially during monsoon and spring seasons which are dominated by, the temperature and water vapors in the atmosphere and it might be the cause of the Grasserie incidences during these seasons, which become very much reduced during rainy season and lacking in summer. Savanurmth *et al.*,¹² also reported that fluctuations between day and night temperature and relative humidity prevailing in rearing house were the important causes for the occurrence of Grasserie in silkworm larvae. Christi and Schaf³ reported that silkworms reared under controlled temperature and relative humidity showed less mortality and increased build up in Grasserie during summer,. Reduction in incidence of Grasserie in year, 2011-12 as compared to 2010 – 2011 as reported in the present study indicated that the Grasserie incidence varied not only seasonally

but also varied from year to year. Such reduction in the incidence of diseases reported may be due to the favorable ambient conditions prevailed during 2011-12. Similarly cleanliness derive after harvesting, a more hygienic practice and timely control measure as suggested by Ramesh Babu *et al.*,¹⁰ and Mahalingam⁸ if followed by the growers always reduces the incidence of Grasserie and such seasonal pathogenic disease in silkworms.

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