

Seasonal Incidence of Pathogenic Disease Flacherie in Silkworm *Bombyx Mori* in Vidarbha Region (Maharashtra)

RASHMI P. JOSHI AND RAJA. I. AHMAD

Research Laboratory of Zoology,
Shri Shivaji College, Akola, Maharashtra
email: rashmisawalkar75@gmail.com

ABSTRACT

The survey of Flacherie disease on silk worm was carried out, during the year 2010-11 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 were surveyed. The incidence of Flacherie reported to varies seasonally. During study year the incidences of Flacherie in spring and monsoon season was higher. The district wise percent incidence in Monsoon season was reported as, Akola 8.0 %, Amravati 7.5 % Buldhana 7.1 %, Yevatmal 6.8 % Washim 6.2 % ., in post monsoon it was, in Amravati 5.8 %, Akola 5.5 %, Washim 5.1 %, Buldhana 4.9 %, Yevatmal 4.8%, in winter season it was recorded as Akola 3.4 %, Amravati 3.1 %, Washim 2.99%, Buldhana 2.86 %, Yevatmal 2.49 % and in spring season the present incidence of Flacherie was reported as Washim 8.66 %, Akola 8.56 %, Amravati 8.21 % , Buldhana 7.56 %, Yevatmal 7.23 % .These results are discussed.

Key words *Flacherie, Vidarbha, Bombyx mori*
Densonucleosis virus (BmDNV),
Streptococci species, Staphylococci species

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 (Govindan and Devaiah, 1998 : Prasad, 1999). 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 generations (Rane, 1911).

Flacherie is caused by both bacteria and viruses individually or in combination. Viral and Bacterial Flacherie is common in silkworms and tend to occur in the hot and humid summer and autumn rearing seasons (Lu Yup-Lian and Liu-Fuan, 1991). The disease causing bacteria are mainly *Streptococci species* and *Staphylococci species*, also *Streptococcus faecalis*, *Streptococcus faecium* as well as *Bacillus thuringiensis*. The viruses causing the pathogenicity to silkworm are *Bombyx mori* Densonucleosis virus (BmDNV). Earlier study of silkworm pathogenic diseases in India during the last four decades was conducted by Pringle, (1984) and claimed that these may vary from season to season and in different agro

climatic conditions. Srivastava and Kumar (2009) mentioned seasonal incidences of Bacterial Flacherie and cytoplasmic polyhedrosis and claimed to cause losses up to 48.9 and 35.4 per cent respectively to the commercial silkworm crop growers. 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 Flacherie. This disease has never been studied and reported before, particularly from the Western Vidarbha region, in Maharashtra.

MATERIAL AND METHOD

With due consent of the farmers in Akola, Amravati, Buldhana, Washim and Yevatmal districts of Western Vidarbha regions in Maharashtra, a season wise survey was conducted during the year 2010-11. As many as 250 silkworm rearing centers located in various villages were surveyed, in the study districts, for incidence of bacterial and viral Flacherie disease in silkworm. 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 (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 bacterial and viral Flacherie in the fields initially was made on the basis of gross pathology at fifth instars larval stage. During every visit, prevailing ambient temperature and relative humidity was determined and recorded. The number was recorded throughout the rearing period in different seasons. The observations on incidence of disease were made 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.

Table 1. (%) Seasonal incidence of Flacherie on mulberry silkworm in Vidarbha region of Maharashtra 2010-11

Seasons → District ↓	Monsoon	Post monsoon	winter season	spring season
Akola	8	5.5	3.4	8.56
Amravati	7.5	5.8	3.1	8.21
Buldhana	7.1	4.9	2.86	7.56
Yevatmal	6.8	4.8	2.49	7.23
Washim	6.2	5.1	2.99	8.66



Larvae with stunted growth



Larva with soft and shrinking midgut



. Larva vomiting gut juice and diarrhea



Sluggish, flaccid condition



. Soft and inelastic skin



Larva turns black with foul smell

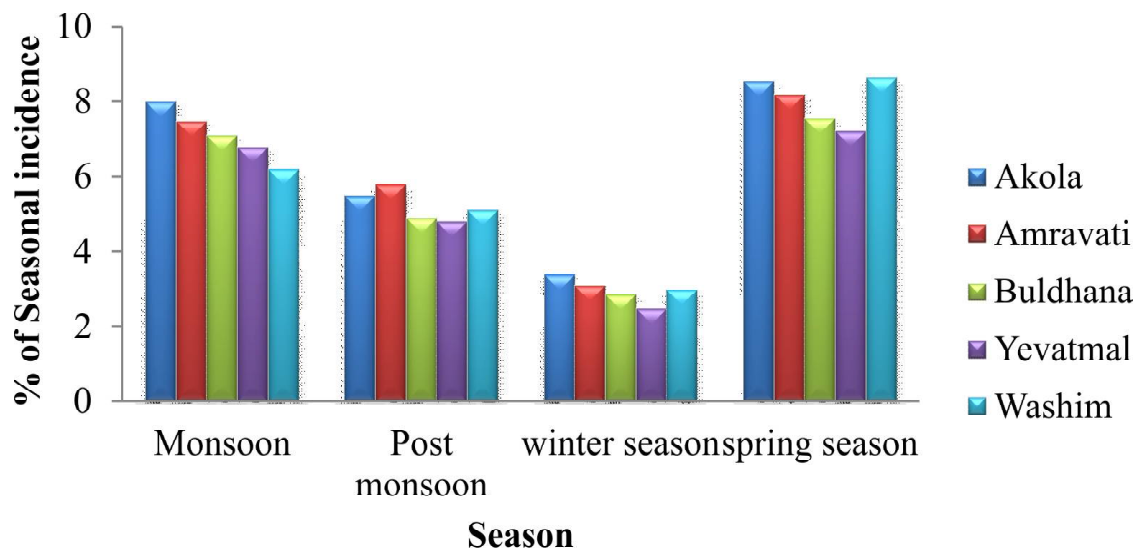


Fig. 1. Percent Seasonal incidence of Flacherie on mulberry silkworm in Vidarbha region of Maharashtra, 2010-11

$$X = (100 \times Y) / Z (1)$$

Where

X = prevalence of Disease (%);

Y = total diseased larvae;

Z = Total number of larvae.)

RESULT AND DISCUSSION

The survey was conducted for 2010-11, in 5 silk worm rearing districts of Vidarbha regions in Maharashtra, which reported that the common breed of silkworm in the study area is dominated by CSR2 and by Kolar gold in summer. Incidence of Flacherie was observed in all studied district in the Vidarbha region throughout 2010-11. The diseased larvae in "Flacherie" which refers to the flaccid condition exhibited by the diseased silkworm (Samson, 1995). Our observation showed that the larvae infected with Flacherie, show refusal to food, behaved sluggish, with stunted growth, there is softening and inelasticity seen in skin. They shrank lengthwise. (Photo plate. I)

As depicted in Table: 1 and Fig.1 the percent incidence of Flacherie is highest during spring and monsoon seasons during the study year. Similar incidence of pathogenic diseases was reported by Etebari *et al.*, (2007) and Chandrasekharan, (2009) who 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 incidences of pathogenic diseases during these seasons, which become reduced with change of seasons.

In monsoon season percent incidence of Flacherie was found to be highest in Akola (8 %) and lowest in Washim (6.2 %). In post monsoon season it was highest in Amravati district (5.8 %) and lowest in Yevatmal district (5.1 %). In winter season it was highest again in Akola district (3.4 %). and lowest in Yevatmal district (2.49 %). In

spring it was highest in Washim district (8.66 %). and lowest in Amravati district (7.21 %) which are in accordance to the same pattern, reported by Reddy and Rao (2009) in the adjoining state of Andhra Pradesh. Savanurmth *et al.*, (1992) also reported that fluctuations between day and night temperature and relative humidity prevailing in rearing houses were the important causes for the occurrence of Flacherie and other pathogenic diseases in silkworm larvae. Ramesh Babu *et al.*, (2009) quoted that high frequency of infections in commercial crops of silkworms may be due to perseverance of the pathogens at high concentrations in the silkworm-rearing units. They further quoted that pathogens are difficult to devastate and can keep on for long periods under amiable conditions. Therefore cleanliness, good quality mulberry leaves, hygienic practices and use of advanced disease resistant breed of silkworm are recommended for protecting the commercial silkworm crop from the seasonal incidence of Flacherie, and similar seasonal infectious diseases in the region.

LITERATURE CITED

- Anantha Selvi G. S. 2011. Studies On The Management of Flacherie in The Mulberry Silkworm *Bombyx Mori* L. Thesis Submitted to Manonmaniam, Sundaranar University.
- Bontha Kasi Reddy and Jemmy Venkata Krishna Rao. 2009. Seasonal Occurrence and Control of Silkworm Diseases, Grasserie, Flacherie. and Muscardine and Insect Pest, Uzi fly in Andhra Pradesh, India. *Int. J. Indust. Entomol.*, **18** (2) : 57 - 61.
- Chandrasekharan, K. 2009. Studies on the management of white muscardine disease in the silkworm, *Bombyx mori* L. Ph.D. Thesis, University of Mysore, Mysore.
- Etebari K., Bizhannia A. R., Sorati R. and Matindoost L. 2007. Biochemical Changes in Hemolymph of Silkworm Larva Due to Admiral Residue. *Pesticide Biochem. Physiol.*, **88**(1) : 14 - 19.
- Etebari K L, Matindoost S. Z. and Mirhoseini M. W. (2007). The

- effect of BmNPV infection on protein metabolism in silkworm (*Bombyx mori*) larva. *ISJ*, **4** : 13 -17.
- Govindan R., Narayanaswamy T. K. and Devaiah M. C. 1998. Principles of silkworm pathology. Seri. scientific publishers, Bangalore, p. 420.
- Lu Yup-Lian and Liu-Fuan, 1991. Silkworm diseases FAO-UN, FAO *Agri Service Bull.*, **73** (4) :1-74.
- Miyajima J. 1978. Effect of high temperature on the incidence of viral flacherie of the silkworm, *Bombyx mori* (L). *Res. Cent.*, **11** : 69-172.
- Prasad, N. R. 1999. Silkworm disease management and its limitations. *Indian Silk*, **39**(4) : 7 – 9.
- Pringle Jameson A. 1984. Report on the Diseases of Silkworm in India. *Journal of Insect Science*, **1** : 1 -78.
- Ramesh Babu K, Ramakrishna S., Harish Y., Kumar Reddy, Lakshmi G., Naidu N. V., Sadak Basha S. and Bhaskar M. 2009. Metabolic alterations of molecular mechanism in silkworm larvae during viral infection: A review. *African Journal of Biotechnology*, **8** (6) : 899 - 907.
- Rane F. W. 1911. The Wilt Disease, Or Flacherie, of the Gypsy Moth. Bussey Institution of Harvard University, Press.
- Samson, M.V. 1995. Flacherie in *Bombyx mori* L. *Indian Silk*, **33**(11): 31-32.
- Selvakumar, T., Balavenkatasubaiiah, M and Nataraju, B. 2001. Studies on prevention and suppression of flacherie in silkworm, *Bombyx mori* L. *Annual repor, CSR and TI. Mysore*. p.101.

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