

A preliminary survey on incidence of seasonal diseases in commercial crops of silkworms in Akola and Washim districts of Maharashtra

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ABSTRACT

In the present study a survey of silkworm *Bombyx mori* for seasonal diseases in Akola and Washim districts were conducted during 2010-2011 and 2011-2012. Larvae of Commercial silkworm crops (CSR2 and Kolar breeds) in Wadegoan, Deulgaon, Sawad, Kalamba, Risod, Maihsaldoh, Malegoan, Khanapur, Patur and Balapur, were examined for Grasserie, Flacherie, Muscardine diseases. We have reported incidence of all these diseases in the study area. The incidence of diseases varied not only seasonally but also varied from year to year. The incidence of Flacherie and Grasserie was higher during rainy and summer season during both study years. The Muscardine was higher during winter season, become very low during Rainy season and was lacking during summer season.

KEY WORDS: WORDS:BOMBYX MORI, FIFTH INSTAR LARVA, GRASSERIE, FLACHERIE, MUSCARDINE

INTRODUCTION

The silkworm *Bombyx mori*, is a commercially important insect, produces the silk. Akola and Washim district though known as cotton producing districts, farmers in villages, are now encouraged for opting sericulture, taking commercial crops throughout the year, using CSR2 and Kolar gold breeds. However there is great deal of loss every harvest as silkworm is susceptible to a number of diseases during rearing. In tropical countries like India, almost all the major pathogenic microbes infect and cause disease to silkworm (Rajsekhar *et al.*, 1992; Doreswamy *et al.*, 2004).

The most common diseases of silkworm are Grasserie caused by a virus: nuclear polyhedrosis, Flacherie, caused by

bacteria: *Streptococcus* and *Staphylococcus* in association with *Flacherie* virus, Muscardine, Aspergilosis, caused by fungal infection, and Pebrin, a protozoan disease caused by a parasitic microsporidian, *Nosema bombycis*. The diseases prevail throughout the year, and in tropics they are significantly high (Srivastava and Kumar, 2009).

These infections vary seasonally, and greatly affect, the economic performance of these worms. According to Sivaprakasam and Robindra (1995) commercial silkworm rearing units are to be regularly surveyed for incidence of such diseases. Such surveys were earlier, conducted by Christi and Schaf (1990) in Jammu and Kashmir State, Samson *et al.*, (1990) in Karnataka, Reddy and Rao, (2009) in Andhra Pradesh, and by Isaiarasu *et al.*, (2011), in Virudhunagar district of Tamilnadu. Such study however has not been carried out in Akola and Washim, the new districts on the sericulture map of Vidarbha

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region in Maharashtra. Therefore attempts are being made to know the seasonal silkworm diseases and their incidence levels, in the commercial silkworm crops in Akola and Washim districts. The results of the study will make local silk growers aware about the diseases and help them to take due control measures.

MATERIAL AND METHODS

Akola and Washim are districts in the Indian state of Maharashtra, which forms central part of Amravati Division. Washim was earlier a part of Akola. These study districts were surveyed and the information of the leading commercial silk growers located in Wadegoan, Deulgaon, Khanapur, Patur and Balapur in Akola district, Sawad, Kalamba, Risod, Maihsaldoh, Malegoan in Washim district was collected. With due consent of the farmers, a Season wise survey of the silkworm diseases was conducted during the year 2010-11 and 2011-12. All the centers were visited during rainy, winter and summer seasons. At fifth instars larval stage external examination was done, to identify worms infected for *Grasserie*, *Flacherie*, *Muscardine* and others. During every visit, prevailing ambient temperature and humidity was determined and recorded.

RESULTS AND DISCUSSION

The survey in Akola and Washim districts revealed that the common breed of silkworm in the area is dominated by CSR2 and by Kolar gold in summer. The data regarding the seasonal diseases in silkworm occurred during the year 2010-11 and 2011-2012 are presented in Table 1.

The figures revealed that all the major diseases of the silkworm namely, *Grasserie*, *Flacherie*, *Muscardine* are reported to infect the silkworm in all studied commercial crops from Akola and Washim districts. Same disease pattern has also reported by Reddy and Rao, (2009) in the districts of adjoining state of Andhra Pradesh. Worms infected with *Grasserie* were sluggish, with swollen inter-segmental region, fragile having easily breakable integument. *Flacherie* infected larvae were, observed to be dull, lethargic, soft and flaccid was vomiting gut juice, with dysentery and chain type faeces. *Muscardine* affected larvae were having oil specks on the surface of the integument and later became hard, dry and enclosed into a white or green coloured structure.

As depicted in the table 1, our first survey (2011-12) reported that in rainy season incidence of *Flacherie* was

7.0 - 9.0%, *Grasserie* was 6.0 - 9.5% and *Muscardine* was 0.5 - 2.5. In winter season, the *Flacherie* was 2.0 - 4.0%, *Grasserie* was 5.0 - 7.0% and *Muscardine* was 19.0 - 22.0%. While in summer season the *Flacherie* was 7.0 - 9.0%, *Grasserie* was 6.0 - 9.5% and *Muscardine* was lacking.

Survey during 2011 - 12, found that in rainy season *Flacherie* was 2.5 - 3.8%, *Grasserie* was 3.0 - 5.0% and *Muscardine* was 0.0 - 1.0%, In winter season *Flacherie* was 0.0 - 1.0%, *Grasserie* was 1.5 - 3.6% and *Muscardine* was nil. In summer season *Flacherie* was 4.0 - 6.8%, *Grasserie* was 3.5 - 6.8% and *Muscardine* was nil.

As per the data, collected during 2010-11 and 2011-12 the incidence of *Flacherie* and *Grasserie* was higher during rainy and summer season in the studied districts. The reports coincide with that of Etebari *et al.*, (2007) and Chandrasekharan, (2009) who reported similar incidence of *Grasserie* and *Flacherie* in the commercial silkworm crops respectively. They claimed that such incidences are caused by greater variations in environmental conditions specially, the temperature and water vapors in the atmosphere during these seasons. Srivastava and Kumar, (2009) too mentioned incidences of bacterial *Flacherie* and cytoplasmic polyhedrosis caused losses up to 48.9 and 35.4 per cent respectively to the commercial silkworm crop growers.

Winter conditions in the region are dry and more suitable for fungal growth; therefore encourage the spread and transmission of *Muscardine* fungus (Miyajima, 1978). Accordingly in the present study too *Muscardine* infection was reported higher during winter season, but very much reduces during rainy season and lacking in summer.

The table also revealed that, there was reduction in incidence of diseases in year, 2011-12 as compared to 2010 2011. It indicated that the incidence of diseases varied not only seasonally but also varied from year to year. The reduction in the incidence of diseases reported may be due to the favorable ambient conditions prevailed during 2011-12. Similarly cleanliness drive after harvesting, a more hygienic practice and timely control measure according to Ramesh Babu *et al.*, (2009) and Mahalingam (2010) if followed by the growers always reduces the incidence pathogenic diseases in, silkworms . High frequency of infections in commercial crops of silkworms may be due to perseverance of the agents at high concentrations in the silkworm-rearing centers (Ramesh Babu *et al.*, 2009). These pathogens are difficult to devastate and can keep on for long periods under amiable conditions. The agents released by diseased worms easily mount up and spread in the rearing unit through different pathogens. Thus it can be concluded that post harvest cleanliness, good quality mulberry leaves, hygienic practices and use of advanced disease resistant breed of

TABLE 1: Survey of silkworm diseases (%) in the commercial crops from Akola and Washim district, during year 2010-2011 and 2011-2012.

Diseases→ Seasons↓	Flacherie(%)		Grasserie (%)		Muscardine(%)	
	2010-2011	2011-2012	2010-2011	2011-2012	2010-2011	2011-2012
Rainy Season	7.0-9.0	2.5-3.8	6.0-9.5	3.0-5.0	0.5-2.5	0.0-1.0
Winter	2.0-4.0	0.0-1.0	5.0-7.0	1.5-3.6	19.0-22.0	8.0-12.0
Summer Season	7.0-9.0	4.0-6.8	6.0-9.5	3.5-7.0	Nil	Nil

silkworm help a great deal in protecting the commercial silkworm crop from the seasonal incidence of Grasserie, Flacherie, and Muscardine in the region.

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