

## MAJOR FOLIAR DISEASES OF MUGA HOST PLANT SOM (*Persea bombycina* KOST.) IN GOALPARA DISTRICT OF ASSAM: A PRELIMINARY SCREENING

Manjit Kumar Ray\*<sup>1</sup>, Piyush Kumar Mishra<sup>1</sup>, Pradip Kumar Baruah<sup>2\*</sup>

<sup>1</sup>DBT Biotech Hub, BN College, Dhubri, Assam, India

<sup>2</sup>Department of Botany, University of Science & Technology, Meghalaya, Baridua-793010, India

\*Author for Correspondence: manjit\_ray2002@yahoo.com

### ABSTRACT

*Persea bombycina* Kost. (som), the primary host plant of Muga silkworm (*Antheraea assamensis* Helfer.) is highly susceptible to various environmental factors such as temperature, rainfall, humidity and various diseases which also effect the muga worms. In this study a preliminary survey was conducted on the major foliar diseases of the muga host plant Som of Goalpara district area. It was seen that the Som leaves were highly affected by Grey blight diseases caused by fungi *Pestalotiopsis disseminata* followed by Leaf Gall caused by insect during the study period. Few other encountered diseases were Leaf Spot, Leaf Rust, Leaf Roller and Leaf Miner. The Percentage Disease Index (PDI) of this study showed that the disease incidence specially for grey blight diseases were higher during the month of August-September (Bhodia) which was 67.60 %, followed by Oct-Nov (Katia) i.e. 57.93 % and the least during Dec-Jan (Jarua) i.e. 43.39 % respectively. This study gives a preliminary data on the major foliar diseases of muga host plant Som and percentage of disease incidence in the Goalpara district of Assam during 3 muga crop seasons. It is noticed that the disease intensity of grey blight disease were higher during August- September i.e Bhodia generations of muga silk worm. Since Muga sericulture has lots of scope for the rural economy of the region so control of various diseases is very much essential and in order to preserve this natural biodiversity present among us the systemic attempts are required to conserve the wild seribiodiversity for ecological balance & for sustainable economic viability.

**Keywords :** *Persea bombycina*, foliar diseases, Grey blight, PDI, Goalpara.

### INTRODUCTION

Som, *Persea bombycina* Kost. belongs to family Lauraceae is the primary host plant for Muga silkworm (*Antheraea assamensis* Helfer) which grows abundantly in Northeastern region of India. Growth of larvae, quality of the cocoon & quantity of the raw silk entirely depends upon the good and healthy quality of the food plant. Better the quality of leaves greater the possibility of obtaining good quality cocoon (Khanikar and Unni, 2006, Acharya *et al.*, 2015). Som is vulnerable to many foliar diseases that effect the normal growth of the plant, quantity and quality of leaves and ultimately cocoon yield production (Das *et al.*, 2003). Environmental factors including temperature, relative humidity and rainfall are the most important epidemiological components of the northeastern region of India that are congenial for the growth of the plants as well as various plant & insect pathogens and disease development. (Cole and Fernandes 1970), (Choudhuri 1981) . One of the foliar disease of muga host plant som is grey blight (Bharali, 1969), caused by a fungus *Pestalotiopsis disseminata*, which has been reported as a major epidemic diseases of Som. Some other fungal disease included leaf spot, leaf rust etc. Many insect pests were also recorded on Som plants in NE regeion of India and listed the major insect pests as gall insect (*Aspondylia* sp), leaf roller, leaf miner (*Phytomyza* sp), stem borer (*Zeuzera indica*), leaf defoliating beetle (*Apogonia* spp), aphid, red tree ant (*Oecophylla smaragdina*) (Borgohain, 2015)

Goalpara district is situated at a distance of 146 km from Guwahati, the capital city of Assam. The district covers an area of 1,824 sq. km and is bounded by West and East Garo hill districts of the state of Meghalaya on the south Kamrup district on the east, Dhubri district on the west and the Brahmaputra all along the north. It is located between latitudes 25.53 degree and 26.30 degree North and longitudes 90.07 degree and 91.05 degree east. Sericulture in Goalpara district existed almost as a practice amongst the people since a long time. Goalpara district has been given the geographical identification mark because its climate is suitable for silkworm rearing (Goswami and Bhattacharya 2013). In accordance with Assamese calendar the Six different generations of Muga silkworm in a year are known as i) Jarua-winter ii) Chatua-early spring iii) Jethua-spring iv) Aherua-early summer v) Bhodia- Summer vi) Kotia –late summer or early winter. As availability of good and healthy plants play an important role in production of quality silk as well as sustainability of muga culture hence a preliminary screening was conducted to study the major foliar diseases of muga host plant som in Goalpara district of Assam during Bhodia( August-September), kotia (October-November) and Jarua(December- January) generations of muga silkworm.

#### **MATERIALS AND METHODS:**

Different age leaves depending upon the size and shape viz. tender, semi mature and mature were randomly collected during rearing (outdoor) season from August, 2014 to January, 2015 in sterile polybags and taken back to the laboratory from 8 different places of Goalpara district depending upon the direction namely Budlung pahar & Matia on the north, Lengopara & Baida on the south, Dorapara Agia & Buraburi on the east and Bhalukdubi & Kalyanpur on the west respectively for collecting the samples during the 3 muga crop seasons .

Disease intensity was determined by randomly selecting 25 plants, five in four corners & five in the centre of the garden (total  $5 \times 5 = 25$  plants). In each plant, total no. of leaves infected with various diseases was counted. First survey on disease incidence in field was conducted in August-September, second survey on disease incidence was conducted in October-November and third survey was conducted in the month of December-January during 3 muga crop seasons. Various foliar diseases was recorded on the basis of the methods Thangavelu et al. (1998) and Das & Benchamin(2000) and with the help of “A diagnostic manual for diseases & pests of muga silkworms and their host plant” by CMER&TI, CSB, Lahdoigarh, Jorhat. The infected leaves were categorized into five grades as suggested by Dubey & Dwivedi (1991).

- Grade 1 – No infection
- Grade 2 – 0-5 % of leaf lamina infected
- Grade 3 – 6 – 25 % of leaf lamina infected
- Grade 4 – 26 -50 % of leaf lamina infected
- Grade 5 ----- 51- 100 % of leaf lamina infected

The Percentage disease index (PDI) was calculated using the standard formula:

$$\text{Percent Disease Index (PDI) \%} = \frac{\text{Sum of numeric grades}}{\text{Total number of plants} \times \text{Maximum grade}} \times 100$$

**PDI % (August- September,2014)**

**PDI % (October- November,2014)**

Branch (Sl. No.)	No. of leaves	Grade				
		1	2	3	4	5
1	23	3	2	3	10	5
2	30	4	3	3	12	8
3	33	5	0	2	22	4
4	27	10	0	6	8	3
5	17	0	0	8	9	0
6	15	5	0	0	7	3
7	20	2	3	3	12	0
8	18	5	1	2	0	10
9	22	0	7	10	0	5
10	37	2	2	15	10	8
Total	242	36	18	52	90	46
Average	24.2	3.6	1.8	5.2	9.0	4.6

Branch (Sl. No.)	No. of leaves	Grade				
		1	2	3	4	5
1	22	5	2	10	5	0
2	33	4	7	12	8	2
3	35	3	2	5	18	7
4	14	4	0	8	0	2
5	18	8	0	0	10	0
6	25	3	0	0	20	2
7	21	4	10	0	2	5
8	15	8	7	0	0	0
9	12	5	0	6	0	1
10	8	3	0	5	0	0
Total	203	47	28	46	63	19
Average	20.3	4.7	2.8	4.6	6.3	1.9

Percentage Disease Index (PDI) = 67.60 %

Percentage Disease Index (PDI) = 57.93 %

**PDI (December,14 - January,2015)**

Branch (Sl. No.)	No. of leaves	Grade				
		1	2	3	4	5
1	30	18	3	4	3	2
2	35	7	5	9	8	6
3	27	10	8	9	0	0
4	20	15	3	0	0	2
5	23	9	2	3	5	4
6	37	23	5	2	0	7
7	28	15	5	3	2	3
8	33	20	10	0	3	0
9	17	7	0	0	0	10
10	21	12	3	4	2	0
Total	271	136	44	34	23	34
Average	27.1	13.6	4.4	3.4	2.3	3.4

Percentage Disease Index (PDI) = 43.39 %

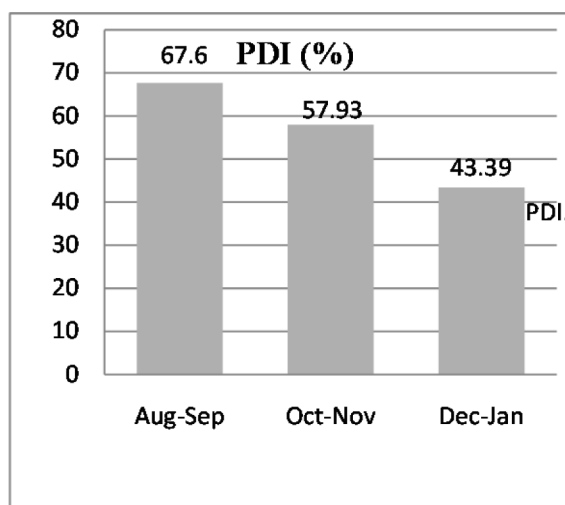


Fig. PDI(%) of grey blight disease

Fig.2. Foliar diseases of muga host plant Som in Goalpara district of Assam



Grey blight



Leaf gall (insect/pest)



Leaf rust (algae)



Leaf spot



Leaf miner



Leaf roller

## RESULT AND DISCUSSION

In this study a preliminary screening was conducted on the major foliar diseases of the muga host plant Som of Goalpara district area. It was seen that the Som leaves were highly affected by Grey blight diseases caused by *Pestalotiopsis disseminata* followed by Leaf Gall caused by gall insect during the study period. Few other encountered diseases were Leaf Spot, Leaf Rust, Leaf Roller & Leaf Miner. The Percentage Disease Index (PDI) of this study showed that the disease incidence of grey blight disease were higher during the month of August-September (Bhodia) which was 67.60 %, followed by Oct-Nov (Katia) i.e. 57.93 % and the least during Dec-Jan (Jarawa) i.e. 43.39 % respectively. This study gives a preliminary data on the major foliar diseases of muga host plant Som and percentage of disease incidence in the Goalpara district of Assam during 3 muga crop seasons. It is noticed that the disease intensity were higher during August- September i.e Bhodia generations of muga silk worm.

Although various works had been done on diseases of muga silk worm and its host plant som in the upper Assam, but in lower part of Assam a very few works has been carried forward. In a study done in RMRS boko, Kamrup district of Assam which is the adjacent district of Goalpara, the present study area, a study was conducted by Gogoi et al.,(2013) on the foliar diseases of som and recorded leaf spot and leaf blight caused by *Phyllosticta perseae* & *Collectotrichum gloesporioides* fungi respectively during Aheruwa & Bhodia seed crops and Jethua & Kotia commercial crops. On the other hand in this present study grey blight caused by *P.disseminata* and leaf infected by the gall insect was the major problem in the study area. Moreover another study on the diseases of muga silk worm in the kamrup district were conducted by Kakoti, 2011, reported that the disease of the worm become high at winter season (Dec- Feb). In her study she mentioned about one protozoan & one bacterial disease of the silkworm. No incidence of viral and fungal infections was recorded during the experimental period. In the present study no incidence of bacterial, protozoan and viral disease of the host plant were recorded from the study location` during the study period.Again, Dutta *et al.*(2010) reported heart rot diseases of muga host plant caused by

fungus *Phellinus contigus* and Canker rot disease of som plant caused by fungus *Biscogniauxia mediterranea*.

In the present study a preliminary screening on the major foliar diseases of som has been conducted. The detailed study, occurrence, isolation of pathogen, distribution & control measures will be conducted due course time.

## CONCLUSION

Based on the preliminary screening conducted on major foliar diseases of muga host plant Som in Goalpara district of Assam it may be concluded that leaves of som plants of the study area were highly affected with grey blight disease followed by leaf gall diseases. Few other diseases encountered with fewer occurrences were leaf spot, leaf rust, leaf roller & leaf miner. The percentage disease index of grey blight disease shows that the disease incidence was higher during the Bhodia generation of muga silkworm i.e August-September. Hence proper disease management strategies should be taken to eradicate the disease for healthy host plant which in turn will help for quality cocoon production and will increase the economic growth. More works will be carried forward in near future.

## ACKNOWLEDGEMENT

Financial assistance received from the Department of Biotechnology, Government of India is gratefully acknowledged.

## REFERENCE

- Acharya A, Ghosh A, Chakraborty B (2015): Serological detection of *P.disseminata* in *P.bombycina* causing grey blight disease. *IJABR* 5(4): 327-333.
- Bharali N (1969): Grey blight disease of Som. *Plant Sci. Cult.* 35: 573-574
- Borgohain A (2015) Different insect pests in muga host plant som (*Persea bombycina*) ecosystem. *IJDR*, 5(7): 4895-4896
- Choudhuri S N (1981): *Muga silk industry*, Directorate of sericulture and weaving, Govt. of Assam, Gauhati, Assam, India, 1-33p
- Cole JS and Fernandes DL (1970): Effects of light, temperature and humidity on sporulation of *Erysiphe cichoracearum* on tobacco. *Trans. British Mycol. Soc.* 55(3): 345-353
- Das R and Benchamin KV (2000): Diseases of muga and eri food plants : Incidence pattern, Intensity & control measures. *Proceedings of National seminar on sericulture, R & D in muga & eri*, CMER&TI, Jorhat Assam, 34-35
- Das R, Das K, Benchamin KV (2003): Diseases of muga food plant som. *Indian silk*, 41:23-24
- Dubey RC and Dwivedi RS (1991): Fungitoxic properties of some plant extracts against vegetative growth and sclerotial viability of *Macrophomina phaseolina*. *Indian Phytopath.* 44(3): 411-413
- Dutta SK, Roychoudhury S, Pandit D, Bajpai AK (2010): Rot diseases of muga hostplant, Som (*Persea bombycina*) in Assam, India. *The Journal of Plant protect. Sci.* 2(2):73-76.
- Gogoi AK, Singh GP, Sahu AK, Giridhar K (2013): Screening of foliar diseases tolerant varieties of Som, *Persea bombycina*- a primary food plant of muga silkworm, *A.assamensis* Helfer. *1<sup>st</sup> Bodoland National Seminar cum workshop on sericulture industry & its role in socioeconomic upliftment in Rural society*, 10-11 August: 110-113

Goswami C and Bhattacharya M (2013): Contribution of Sericulture to Women's Income in Assam - A Case Study in Goalpara District of Assam, India, *International Journal of Scientific and Research Publications* **3**: 3

Khanikar D and Unni BG (2006): Food plant biochemistry and its role in growth & development of muga silkworm, *A.assama* Ww. In: *Muga silkworm Biochemistry Biotechnology Molecular biology*, (Ed Unni, B.G., RRL, Jorhat). 88-101pp

Kakoti R (2011): Impact of environmental factors on outbreak of diseases in the muga crops, *A.assama* Westwood (Lepidoptera: Saturniidae) in Kamrup district (Assam). *The Bioscan* **6**(1): 103-106

Thangavelu K, Chakraborty AK, Bhagawati AK, Isa M (1998): *Handbook of muga culture*. CSB, Bangalore India