

Forewarning of Myrothecium Leaf Spot Disease of Mulberry (*Morus alba* L.) in Malda District of West Bengal and its Prophylactic Measure

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ABSTRACT

One of the major constrain of mulberry (*Morus alba*, L.) cultivation is the out break of pests and diseases in mulberry field. Incidence of Myrothecium leaf spot (*Myrothecium roridum*) disease in the leaves of mulberry in Malda district is very common. The disease severity data (PDI) of Myrothecium leaf spot (MLS) in three different villages viz. Pataldanga, Khanpara and Mohabbatpur of Malda district in weekly interval and day wise meteorological data (viz. maximum temperature, minimum temperature, maximum relative humidity (%), minimum relative humidity (%) and rainfall) were collected compiled during 2006 -2011. Correlation coefficient (r) of disease incidence shows a significant positive correlation with the meteorological variable viz. maximum RH but negative correlation with maximum and minimum temperature, minimum RH and rainfall. Prediction of disease severity is done by regression analysis and severity of MLS of Malda is predicted as $Y = - 6.941 + 0.049 X_1 + 0.073 X_2 - 0.043 X_3 + 0.026 X_4 + 0.009 X_5$, when X_1 = Maximum temperature, X_2 = Minimum temperature, X_3 = Maximum relative humidity, X_4 = Minimum relative humidity, X_5 = Rainfall, and Y = Predicted disease severity. Moreover coefficient of determination, $R^2 = 0.252$ Application of 0.1% Carbendazim (Bavistin, 50%WP), @ 180 litre per acre to control the disease incidence is recommended.

Keywords: Myrothecium Leaf Spot (MLS) , Correlation Coefficient, Regression Analysis

INTRODUCTION

Incidence of Myrothecium leaf spot (MLS) in the mulberry field of Malda district of West Bengal is very common. Control of pests and diseases of mulberry can increase leaf yield qualitatively and quantitatively. Disease causes 10 – 15% leaf loss quantitatively (Qadri *et al.*, 1999). Intensity of disease mainly depends on agricultural inputs and climatic conditions and field management. Incidence of Myrothecium leaf spot (*Myrothecium roridum*) disease in the leaves of mulberry in Malda district is predominating mainly in summer season (Pratheesh Kumar *et al.*, 2004). The disease appears (Fig.1) small to medium sized brown irregular spots appear on the both sides of leaves. In advanced stage necrotic spots shed off and form holes. This is commonly called brown leaf spot disease of mulberry (Chattopadhyay *et al.*, 2002). Feeding of diseased leaves results poor cocoon crop and causes reduction in the income of the

rearers, therefore timely management for control of disease is the prerequisite for harvesting healthy and nutritious leaves (Govindaiah *et al.*, 2005).

MATERIALS AND METHODS

In Malda district the disease severity data (PDI) was collected from three different villages' viz. Pataldanga, Khanpara and Mohabbatpur in weekly interval. Moreover day wise meteorological data viz. maximum temperature, minimum temperature, maximum relative humidity (%), minimum relative humidity (%) and rainfall were also collected during 2006 to 2011 in S1 mulberry variety. During collection of disease data, three branches of a bush are randomly selected and tagged from one-one plants. To measure the disease incidence, the total number of leaves and the number of leaves infected with disease are counted on the selected branches.

For measuring the percentage of disease index (PDI), all infected leaves are categorized into different grades of infection using the following grading scale (0-5).

Grading Scale

- Grade -0= No infection
- Grade -1= 0-5% leaf lamina covered by the symptom
- Grade -2= 6-10% leaf lamina covered by the symptom
- Grade -3= 11-25% leaf lamina covered by the symptom
- Grade -4= 26-50% leaf lamina covered by the symptom
- Grade =5 = 50% and above leaf lamina covered by the symptom

Percent disease index (PDI) was calculated according to FAO formula (1967).

$$\text{Percent disease index (PDI)} = \frac{\text{Sum of all individual rating}}{\text{Total no. of leaves observed} \times \text{Maximum grade (5)}} \times 100$$

RESULTS AND DISCUSSION

Prevalence of Myrothecium leaf spot (MLS) disease of Malda district is > ETL (> 5 PDI). Maximum severity was recorded as 8.90 PDI (Table – I) during

November,2008. Moreover the disease severity was observed during April to November in every year.

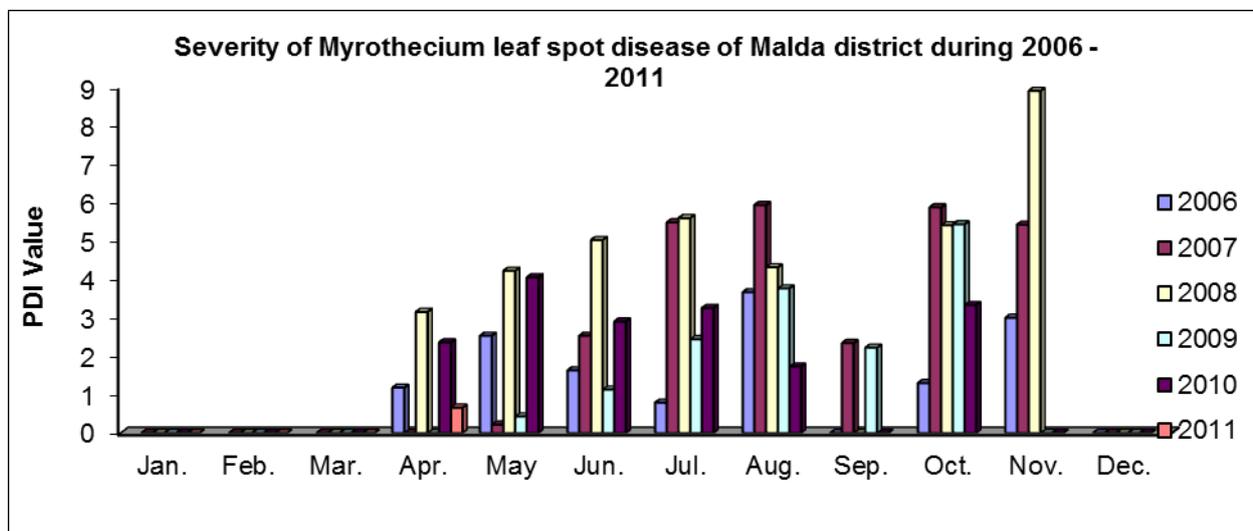


Fig. 1: Myrothecium leaf spot disease (*Myrothecium roridum*) of mulberry

Correlation coefficient of disease severity and meteorological variables of this zone shows that the intensity of the disease has a positive correlation with maximum RH, but negative correlation with minimum RH, maximum temperature, minimum temperature and rainfall, with 1% level of significance in all parameters.

Temperature, relative humidity and rainfall are the prime factors influencing the disease severity. Prediction of disease severity through input of disease and meteorological data was done by regression analysis $Y = a_1 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5$, when X_1 = Maximum temperature, X_2 = Minimum temperature X_3 = Maximum relative humidity X_4 = Minimum relative humidity X_5 = Rainfall, Y = Predicted disease severity, a_1 = Intercept, $b_1 - b_5$ = Partial regression coefficient for weather factors. Regression equation analysis for MLS disease of Malda stands as $Y = -6.941 + 0.049 X_1 + 0.073 X_2 - 0.043 X_3 + 0.026 X_4 + 0.009 X_5$ when coefficient of determination $R^2 = 0.252$. Validity of the model was tested. Predicted disease severity is very close with observed disease severity. Review of literature shows 14 – 15% loss of leaf yield due

to feeding of infected leaves to silkworm (Qadri *et al* 1999). Chet *et al* (1981) observed the bio control potential for mulberry disease by use of *Trichoderma* sp. Moreover Singh (1984) recommended the principles of Plant pathology. Mulberry plants are very prone to diseases and pests. Severity of mulberry disease of Eastern and North Eastern India was studied by Dutta *et al* (2011 – 2012), Bacterial leaf spot and Powdery mildew disease of mulberry was studied by Maji *et al*, (1998 – 2011), Powdery mildew, Myrothecium leaf spot and its control measure was studied by Pratheesh Kumar *et al*, (2000 – 2004). Technique of crop loss assessment due to pests and diseases of mulberry was recorded in FAO, 1967. Gobindaiah *et al* (2005) suggested different techniques of mulberry crop protection. Earlier detail study of Myrothecium leaf spot was studied by Chattopadhyay *et al*. (2002 – 2003). As prophylactic measure application of 0.1% Carbendazim (BAVISTIN) for control of Myrothecium leaf spot (*Myrothecium roridum*) disease of mulberry @ 180 litre per acre was recommended.

LITERATURE CITED

- Chattopadhyay S, Maji MD, Pratheesh Kumar PM, Saratchandra B, 2002.** Response of mulberry brown leaf spot fungus (*Myrothecium roridum*) to different plant extracts, *International J. Industrial Ento.*, **5(2)**: 183-188.
- Chattopadhyay S, Maji MD, and Pratheesh Kumar PM, 2003.** Sensitivity of mulberry brown leaf spot pathogen *Myrothecium roridum* to different plant extracts. National Conference on Tropical Sericulture for global competitiveness, 5-7th Nov. 03.
- Chet I, Barker R, 1981.** Isolation and Bio control potential of *Trichoderma humatum* from soil naturally suppressive *Rhizoctinia solani*. *Phytopathology*, **71**:286 – 290.
- Dutta SK, Maji MD, Ghosh A, Roy Choudhury S, Choudhuri B, and Majumdar MK and Bindroo BB, 2011.** Survey on disease severity of mulberry (*Morus alba*L.) in different seasons of Aizawl district (Mizoram) *Journal of Crop and Weed*, **7(2)**:253.
- Dutta SK, Maji MD, Ghosh MK, Borah A, and Bindroo BB, 2012.** Study on correlation between meteorological variables and severity of Leaf rust of mulberry in Dimapur(Nagaland) - National Symposium on approaches to maximizing crop productivity at Institute of Agricultural science, University of Calcutta on 12-14 th January,2012-Book of Abstracts p.97,2012.
- Dutta SK, Ghosh MK, and Bindroo BB, 2012.** Study on severity of Powdery Mildew disease of mulberry in Eastern And North Eastern India; National Conference on “Recent Trends in Plant Sciences” organized by Tuljaram Chaturchand College, Baramati (Maharashtra), scheduled to be held during 3-5 February, 2012.A bstract proceedings P.87.2012.
- F.A.O. 1967** Crop loss due to diseases and pests. Food and Agricultural Organization. Rome.
- Govindaiah, Gupta VP, Sharma DD, Rajaduari SS, and Naik NV, 2005.** *Mulberry Crop Protection book 1st* ed. Pp 1 – 459.
- Maji MD, Qadri SMH, and Pal SC, 1998.** *Xanthomonas campestris* pv *.mori* a new bacterial leaf spot causing pathogen of mulberry. *Sericologia*, **38(3)**: 519-522.

Maji MD, Qadri SMH, and Pal SC, 2000. Control of bacterial leaf spot of mulberry caused *Xanthomonas campestris* pv. *mori*. *Indian J. Sericulture*, **38**(1): 81-83.

Maji MD, Qadri SMH, Das NK and Pal SC, 2002. Meteorological factors in relation to development and prediction of bacterial leaf spot disease of mulberry (*Morus* sp.). *Indian Academy of Sericulture*, **6**(2):107-108.

Maji MD, Qadri SMH, and Pal SC 2002. Evaluation of mulberry phylloplane microorganisms for biological control of bacterial leaf spot of mulberry caused by *Xanthomonas campestris* pv. *mori*, *Indian Journal of Agricultural Research*, **37**: 307-309.

Maji MD, Dutta SK, Das NK and Maji C, 2011. Epidemiology on prediction of Powdery mildew of mulberry caused by *Phyllactinia corylea*. Abstract. International Symposium on "System intensification towards food and environmental security" at BCKV, Mohanpur on 24th-27th February, 2011 pg. 209.2011.

Pratheesh Kumar PM, Qadri SMH, Maji MD, Gangwar SK, and Saratchadra B, 2000. Biological control *Phyllactinia corylea* (Pers) Karst using composted extracts, *Indian J. Sericulture*, **39**(1): 81-83.

Pratheesh Kumar PM, Qadri SMH, Pal SC, Mishra AK, Raje Urs, 2003. Post infection Physiobiological alteration at various intensities of leaf spot (*Myrothecium roridum*) in mulberry *International J. Industrial Ento*, **7**(2)175-180.

Pratheesh Kumar PM, Qadri SMH, Pal SC, Saratchandra B, 1999. B. Evaluation of few fungicides against two leaf spot diseases of mulberry (*Morus* spp.) *Bull. Seric. Res.* **10**:9-15.

Pratheesh Kumar PM, Maji MD, Chattopadhyay S, and Raje Urs, 2004. Isolation and evaluation of bacterial biocontrol agents for management of leaf spot (*Myrothecium roridum*) in mulberry. *J. Mycopathal Res.*, **42**(1): 43-47.

Qadri SMH, Gangwar SK, Pratheesh Kumar PM, Elangavon C, Maji MD, and Saratchadra, B, 1999. Crop loss assessment due to leaf spot disease of mulberry *Indian J. Sericulture*, **38**(1): 35-39.

Singh RS, 1984. Introduction to principles of Plant Pathology, 3rd Ed. Oxford and INH publishing co., New Delhi, pp. 1 - 534.

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