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Prediction Model For Bacterial Blight Of Cotton (Hybrid NHH 44)

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ABSTRACT

Observations of bacterial blight intensity were recorded on protected and unprotected plots of cotton hybrid NHH 44 grown at Marathwada Agricultural University Campus, Parbhani and farmer's field at Asola during the year 2002-2003. Meteorological parameters such as temperature(°C), relative humidity, rainfall (mm), wind speed (kmph) and bright sunshine (hours) were considered to develop prediction model for bacterial blight intensity. Meteorological parameters existing 4 and 7 days prior to bacterial blight intensity and their cumulative sum were tried in the prediction system consisting of multiple regression equation. Results indicated that regression equations based on cumulative sum of meteorological parameters are more reliable because of high coefficient of determination and low prediction error.

Key words : Bacterial blight, meteorological parameters, prediction, multiple regression.

INTRODUCTION

Bacterial blight of cotton caused by *Xanthomonas axonopodis* pv. *malvacearum* is one of the serious diseases of cotton causing symptoms in various stages of the crop. Disease is widely prevalent in cotton growing areas of India (Verma, 1986 and Srinivasan, 1994). Although precise estimate of losses caused by disease are not available, it is predicted that losses are often very high (Mishra and Krishna, 2001 and Patil *et al*., 2001 and 2003). Present management strategies do not provide adequate protection against the disease. Since weather based forecasting module is not available growers often undertake chemical management either indiscriminately or very late when the disease has already resulted in appreciable loss. Therefore, attempt has been made in present study to formulate weather based forecasting system for prediction of bacterial blight intensity which will enable to undertake timely plant protection.

MATERIALS AND METHODS

Two plots of cotton hybrid NHH 44 were raised at Meteorology Department of Marathwada Agricultural University Campus, Parbhani having gross area of 25 x 20 metres each. One of the plot did not receive any fungicidal application. The other plot was protected with recommended fungicidal application (Copper oxychloride 0.25 %). In farmers field at Asola village, only protected plot was grown. Crop was sown at the spacing of 90 x 60 cm^2. Experimental plots were applied with recommended fertilizers i.e. 80 kg N (two split doses) + 40 kg P_2O_5 and 40 kg K_2O/ha. The plots were kept weed free by regular hoeings and hand weedings. Insecticidal (dimethoate, metasystox, endosulfan, quinalphos application was made to protect these plots from insect damage. Bacterial blight intensity was recorded in 0 to 4 scale as described by Raj (1998). Per cent disease intensity was computed on the basis of observations recorded on 5 plants at random from each plot. Observations were continued from occurrence of disease till 180 days of crop growth i.e. crop harvest, at weekly interval. The cotton hybrid NHH 44 plots at Marathwada Agricultural University, Parbhani and on farmers field were sown on 29.6.2002. Daily observations of meteorological parameters such as minimum and maximum temperature (0°C), RH (%, a.m.), RH (%, p.m.), rainfall (mm), wind velocity (kmph), bright sunshine (hrs) were recorded at Meteorological Laboratory located near to Experimental Plot at Marathwada Agricultural University, Parbhani during crop growth period. Same observations were considered for experimental plot on farmers field which was about 8 kms away from this site. From these observations minimum temperature/day, minimum relative humidity/day, etc. were computed.

Multiple regressions between meteorological parameters and disease intensity were worked out to disintangle and measure the effect of meteorological parameters on disease intensity. Meteorological parameters were considered as independent (X) variables while disease intensity was considered as dependent (Y)

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