Research Paper :

Prediction model for bacterial blight of cotton

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SUMMARY

Protected and unprotected plots of cotton variety, PA 183 were grown during the year 2003-04 in the field of Marathwada Agricultural University, Parbhani. Intensity of bacterial blight was recorded from occurrence of the disease till harvest of the crop at weekly interval. Meteorological parameters such as temperature (^{o}C), relative humidity (%), rainfall (mm), wind velocity (kmph) and bright sunshine (hrs) were used to develop multiple regression equation for prediction of bacterial blight intensity. Results indicated that prediction equations developed on the basis of meteorological parameters prevailing 4 and 7 days prior to bacterial blight intensity suffered from high prediction error. When prediction equations were developed based on cumulative sum of meteorological parameters had high value of coefficient of determination and low prediction error.

Bacterial blight of cotton caused by *Xanthomonas axonopodis* pv. *malvacearum* is one of the serious diseases of cotton.Disease is widely prevalent in cotton growing areas of India (Verma, 1986 and Srinivasan, 1994), causing losses upto 30 per cent (Mishra and Krishna, 2001 and Patil *et al.*, 2001 and 2003) which may be very high if it appears in epidemic form. A few management strategies available against the disease do not provide adequate protection. Since weather based forecasting module is not available growers often either undertake excess chemical management or undertake it very late when the disease has already resulted in appreciable loss. Thus, there is a acute need to formulate weather based forecasting system so that growers can undertake timely plant protection. In the light of this situation present study was undertaken to formulate weather based forecasting module for prediction of bacterial blight in cotton (var. PA 183).

MATERIALS AND METHODS

Two plots of cotton variety PA 183 were raised at Meteorology Department of Marathwada Agricultural University Campus, Parbhani having gross area of 25 x 20 metres each. One of the plots did not receive any fungicidal application. The other plot was protected with recommended fungicidal application (Copper oxychloride 0.25 %). Crop

was sown at the spacing of 45 x 30 cm^2. Experimental plots were applied with recommended fertilizers. 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. 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, PA 183 was sown on 4.7.2003.Daily observations of meteorological parameters such as minimum and maximum temperature (0^oC), 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 the crop growth period. 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 disentangle and measure the effect of meteorological parameters on disease intensity. Meteorological parameters were considered as independent