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Linear regression study between meteorological parameters and bacterial blight of Cotton (Var. PA 183)

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SUMMARY
Two experimental plots at Marathwada Agricultural University Campus, Parbhani and one experimental plot at village Asola were grown to record intensity of bacterial blight disease. Observational of meteorological parameters recorded at Department of Meteorology, MAU, Parbhani were used to workedout linear regression relationship with bacterial blight intensity. A prediction system based on observation of individual meteorological parameters 4 and 7 days prior to bacterial blight intensity and cumulative sum of meteorological parameters at these stages was developed for the years 2002-03 and 2003-04. Although such a prediction system is having high prediction error is suitable for forecasting bacterial blight intensity when information about a single meteorological parameters is available.

Key words: Bacterial blight intensity, meteorological parameters, cotton, linear regression .

Bacterial blight of cotton caused by *Xanthomonas axonopodis* pv. *malvacearum* is one of the severe diseases of the crop causing losses upto 30 per cent (Rampandu *et al*., 1979; Meshram *et al*. 1988; Meshram and Raj, 1992; Mishra and Krishna, 2001 and Patil *et al*. 2001 and 2003). At present disease is managed by spraying fungicides/antibiotics. However, in the lack of weather based forecasting system farmers undertake chemical sprays when disease is in severe forms which only restrict the spread of disease. Damage caused, to cotton crop is however is irreversible. Review of literature indicate that forecasting module for deshi cotton is not available. Therefore, there is a acute need of such a study so that farmers can be made aware regarding occurrence and probable intensity of the disease at appropriate time. In the light of this situation present study was aimed to establish linear relationship between meteorological parameters and disease intensity of bacterial blight of cotton (var. PA 183).

MATERIALS AND METHODS

The cotton variety PA 183 plots at Marathwada Agricultural University, Parbhani were sown on 20.7.2002 and 4.7.2003, respectively. The plot size was 1000 sq.m. for NHH 44 hybrid and 500 sq.m. for PA 183 for each plot.

Each plot was further sub-divided into two equal halves for protected and unprotected crop. The plot size was 500 m^2 for farmer's field. PA 183 was sown at the spacing 45 x 30 cm^2. The experimental plots were applied with recommended fertilizers. The plots were kept weed free by regular hoeings and hand weedings.

These plots were frequently visited for occurrence of bacterial blight. From first occurrence of bacterial blight observations were recorded at weekly interval.

Linear regressions between individual 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) variable.
The X variables were.

X_1 = Minimum temperature (°C)
X_2 = Maximum temperature (°C)
X_3 = Mean temperature (°C)
X_4 = Relative humidity (a.m.)
X_5 = Mean relative humidity (%)
X_6 = Relative humidity (p.m.)
X_7 = Rainfall (mm)
X_8 = Wind velocity (km/h)
X_9 = Bright sunshine (hrs), and
Y = Disease intensity of bacterial blight (%).

In simple regression studies prediction of Y (disease intensity) was done by using formula $Y = a + bx$.
Where,
a = interception point
b = regression coefficient for X variable

RESULTS AND DISCUSSION

The various regression equations obtained from prediction of bacterial blight intensity in protective and unprotective plots at Marathwada Agricultural University Campus, Parbhani for existing meteorological parameters and cumulative sum of individual parameter 4 and 7 days prior to bacterial blight intensity have been worked out. The equations (Tables 1 and 2) for individual meteorological parameters have been considered worth for prediction of

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