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PROGRESS OF *ALTERNARIA* BLIGHT OF SUNFLOWER IN RELATION TO ENVIRONMENT AND HOST AGE

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An investigation was carried out to study the role of environmental factors on the severity of foliar blight of sunflower incited by *Alternaria alternata* (Fr.) Keissler during Kharif season of 1995 and 1996. The two year study revealed that the disease was initiated in the month of July when average temperature was 29.78-30.31°C, relative humidity 83.45-84.4 percent and rainfall of 60 mm. Maximum disease development was favoured by atmospheric temperature 28-31°C, relative humidity of 88 percent and above and rainfall 100-120 mm. Maximum susceptibility to infection was recorded in 60 days old plants of sunflower.

Keywords : *Alternaria alternata*; Blight; Sunflower.

Introduction

The foliar blight of sunflower incited by *Alternaria alternata (Fr.)* Keissler is one of the destructive diseases in sunflower growing areas inflicting heavy damages to thecrop[1]. It was reported for the first time in India by Bose[2]. The disease affects all the aerial parts of the plant[3]. Environmental factors play a major role in the occurrence and development of disease. The environmental variables viz. temperature, relative humidity and rainfall are most crucial since they affect pathogen or host pathogen interaction during pathogenesis. The climatic conditions of our country generally favour incidence of foliar blight of sunflower in Kharif season but no precise information is available in disease development in relation to environmental factors and host age. Present investigation has therefore been undertaken to study progress of disease in relation to atmospheric temperature, relative humidity, rainfall and host age.

Material and Method

A singhle plot field experiment was conducted. 50 plants were raised in the field with row to row spacing of 60 cm and plant to plant spacing of 30 cm in a randomized block design susceptible variety of sunflower EC - 68415 was selected for studying the progress of disease in terms of percent disease intensity measured on the basis of leaf area affected fortnightly during Kharif season of 1995 and 1996. Ten plants were randomly selected and tagged for recording the development of disease under natural conditions. The data of environmental variables were collected from meteorological department.

To ascertain susceptible growth period of the host towards blight disease, the plants were raised from surface sterilized healthy seeds of sunflower var. EC-68415 in earthen pots containing autoclaved soil. Four plants per-pot were maintained and three replications were kept for each age. Sowing commenced from 1st July and continued upto September. Plants were inoculated with spore suspension of *A. alternata* and incubated for 48 hours in moist chamber by covering with polythene bags.

Result and Discussion

Atmospheric temperature and relative humidity are deciding factors for development of any disease in nature[4]. The development of foliar blight of sunflower in relation to weather variables has been presented in Fig. 1. The variation in disease intensity in different dates of observation were found statistically significatnt. A significant correlation was observed between environment variables and disease severity. The data revealed that the congenial weather for disease initiation prevailed in second fortnight of July during both the years of study, when average

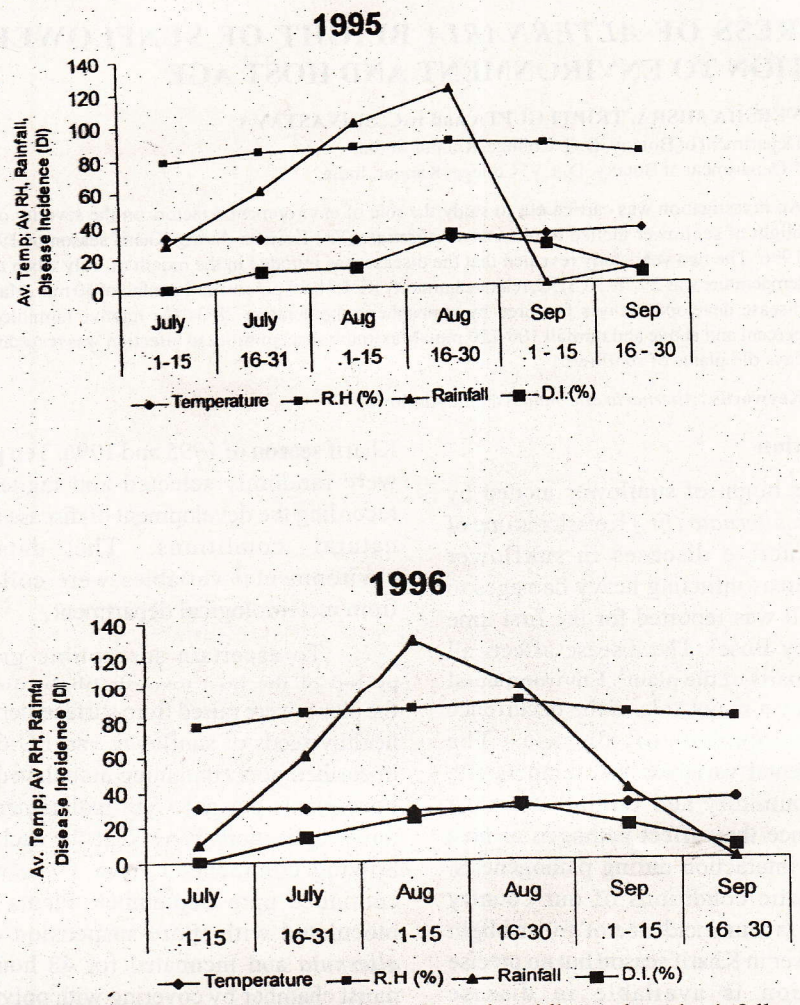

Fig. 1. Effect of atmospheric temperature, relative humidity and total rainfall on disease development.

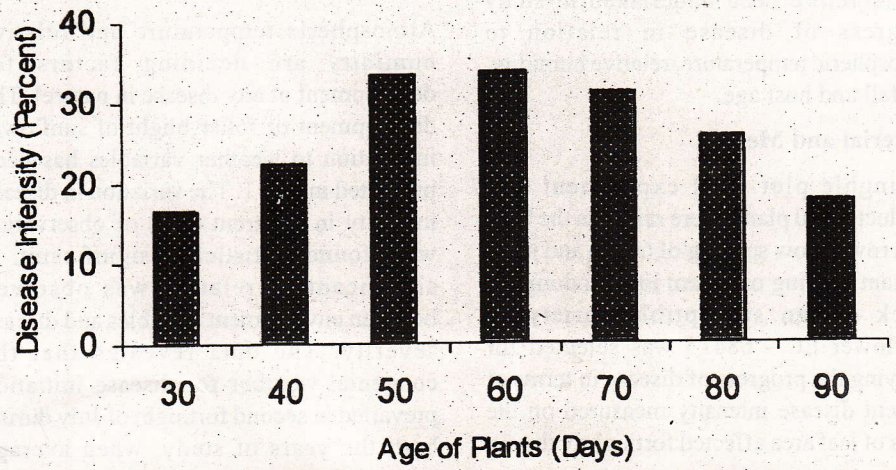

Fig. 2. Effect of age of sunflower plant on the development of disease caused by *A. alternata*.

temperature was 29.78-30.31°C, relative humidity 83.45-84.4 percent and cumulative rainfall 60 mm. The incidence was however found low during early phase. The disease survived throughout the rainy season in a wide range of temperature, relative humidity and rainfall but its intensity was found gradually increasing with the increase in relative humidity and reduction in temperature, reaching optimum (32.05 and 31.6 percent) during second fortnight of August during 1995 and 1996 crop seasons respectively. During peak development of disease in both the years the temperature was 28.21-29-21°C, relative humidity 88.30-90.20 percent and rainfall 100-120 mm. The disease incidence recorded during 1996 was comparatively lower than during 1995. Weather data revealed that average temperature and relative humidity were less during 1995 crop season except the rainfall which was more in comparison to 1996. However the period of maximum incidence coincided with high rainfall, relative humidity along with moderate temperature during both the years of study.

Maximum severity of disease was noted in sunflower plants at 60 days after sowing when the temperature decreased and humididy increased appreciably. The disease severity showed gradual decline in periodic increase after the end of September till harvesting of the crop when average atmospheric humidity began to decrease and temperature started rising.

During present study it was revealed that disease severity, atmospheric humidity and rainfall exhibited positive relationship but disease severity and atmospheric temperature exhibited negative correlation. This suggested that moderately low temperature and high humidity favoured multiplication of spores of *Alternaria alternata* in the air which in turn increased disease severity in sunflower crop.

The present findings are in agreement with the results of earlier workers working on *Alternaria* on different host plants. Saad and Hagedorn[5] also found that relative humidity over 95 percent and low temperature favoured severe outbreak of leaf spot of bean incited by *A. alternata*. Singh and Prasad[6] stated that *A. cucmerina* can survive even at temperature of 35°C. Logopodi and Thanassoulopoulos[7] also found that temperature of 27-29°C and relative humidity of 78-80% were favourable for development of leaf spot of sunflower by Greece caused by *A. alternata*.

There were ample rains throughout the crop growing season and disease intensity was found directly correlated with cumulative rainfall. It may be inferred that disease initiation and its progress have been influenced by rainfall received during pre and post infection period of the crop growth since it increased relative humidity. Rangaswami and Rao[8] reported maximum intensity of *Alternaria* blight of clusterbean in years of more than normal rainfall.

The pathogen was able to infect plants of sunflower at all ages but the susceptibility of plants varied with age. The infection was found minimum at the age of 30 days showing only 16.30 percent intensity; thereafter it increased gradually and reached maximum 33.64 percent in 60 days old plants and finally it declined with increase in age and found only 17.47 percent in 90 days old plants (Fig. 2). Hence the rapid increase in disease intensity particularly during middle part of the crop may be due to higher inoculum build up, increased host susceptibility and congenial weather conditins. These findings are in agreement with those of Shukla[9] and Yogendra Singh *et al.*[10] for different races of *Alternaria*.

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