

Effect of abiotic factors on incidence of *Sclerotinia* rot on Indian mustard

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Abstract

Rot of Indian mustard (*Brassica juncea*) caused by *Sclerotinia sclerotiorum* (Lib.) de Bary has become important in recent times in India and elsewhere with high disease incidence and severe yield losses leading to discouragement of growers of the crop. The pathogen is reported to infect about 400 plant species with no proven source of resistance against the disease reported till date in any of the hosts. An experiment was laid out at farm of the Centre [77°27'E, 27°12'N, 160 m above mean sea level, deep loamy alluvium derived soil with pH 8.0] in plots of 5 m×4.8 m with 30 cm×10 cm spacing in randomised block design with four replications and three dates of sowing (07, 28 Oct, 18 Nov 2005) using the test variety Rohini to understand the effect of different abiotic factors on incidence of the disease. Soil moisture data was recorded at weekly intervals from each plot by gravimetric method. Collecting petals during flowering period daily between 0800-1000 hrs and placing them on chloramphenicol amended potato dextrose agar medium recorded infestation of Indian mustard petals by spores of *S. sclerotiorum*. Weather parameters, viz., maximum and minimum temperature, morning and afternoon relative humidity, bright sunshine hours were recorded at a meteorological observatory about 200 m from the site of experimentation. Analysis of data indicated that the petal infestation by pathogen spores was positively related (R^2 : 0.97) with increase in bright sunshine hours. Incidence of *Sclerotinia* rot was positively correlated with increase in soil moisture content (R^2 : 0.84), particularly during the flowering period and more specifically between 50 and 60 days after sowing. Combination of clear sky with cool weather and high soil moisture during the critical stage of 50-60 day age of crop seems to have favoured higher *Sclerotinia* rot incidence on Indian mustard at the site of experimentation.

Key words: *Brassica juncea*, *Sclerotinia sclerotiorum*, epidemiology

Introduction

Indian mustard [*Brassica juncea* (L.) Czern and Coss.] is an important oilseed crop of India. During 2003-04, rapeseed-mustard represented 21.6 and 23.2 per cent of the total oilseed hectareage and production, respectively. Rot of mustard caused by *Sclerotinia sclerotiorum* (Lib.) de Bary has become important recently in India and elsewhere with high disease incidence and severe yield losses leading to discouragement of growers of the crop (Chattopadhyay *et al.*, 2003). The pathogen is known to infect about 408 plant species (Boland and Hall, 1994) with no proven source of resistance. Unlike several temperate countries, in India the soilborne inoculum happens to be the most important source of infection. Because of the wide host range and lack of tissue specificity, breeding resistant varieties appears to be less successful. Knowledge about the epidemiology of the disease is essential for devising effective disease management strategy. Information on the abiotic factors governing the disease has been studied to some extent in America and European continents. But no information is available on the aspect under Indian conditions. Here we report the observations of a pilot study conducted in 2006-07 crop season.

Materials and methods

An experiment was laid out at experimental farm of the Centre [77°27'E, 27°12'N, 160 m above mean sea level, deep loamy alluvium derived soil with pH 8.0] in plots of 5 m×4.8 m with 30 cm×10 cm spacing in randomised block design with four replications and three dates of sowing (07, 28 Oct, 18 Nov 2005) using the test variety Rohini to understand the effect of different abiotic factors on incidence of the disease. Soil moisture data was recorded at weekly intervals from each plot by gravimetric method. Collecting petals during flowering period daily between 0800-1000 hrs and placing them on chloramphenicol amended potato dextrose agar medium recorded infestation of Indian mustard petals by spores of *S. sclerotiorum*. Weather parameters, viz., maximum and minimum temperature, morning and afternoon relative humidity, bright sunshine hours were recorded at a meteorological observatory about 200 m from the site of experimentation. Percentage disease incidence (PDI) was recorded before harvest.

Results and Discussion

Analysis of data indicated that the petal infestation by pathogen spores was positively related (R^2 : 0.97) with increase in bright sunshine hours. However, petal infestation was also influenced by afternoon (1420 hrs) relative humidity and maximum temperature (Figure 1). Incidence of *Sclerotinia* rot was positively correlated with increase in soil moisture content (R^2 : 0.84), particularly during the flowering period and more specifically between 50 and 60 days after sowing (Figure 2). Combination of clear sky with cool weather and high soil moisture during the critical stage of 50-60 day age of crop seems to have favoured higher *Sclerotinia* rot incidence on Indian mustard at the site of experimentation. Similar relation of *Sclerotinia* rot incidence with soil moisture and other abiotic factors have been noted earlier (Morrall and Dueck, 1982; Kora *et al.*, 2005) in other

countries. However, such pilot study was not done earlier in India. This study provides a base for further detailed analysis of data for establishment of stable relationships of specific abiotic factors vis-à-vis *Sclerotinia* rot incidence and petal infestation by the pathogen inoculum.

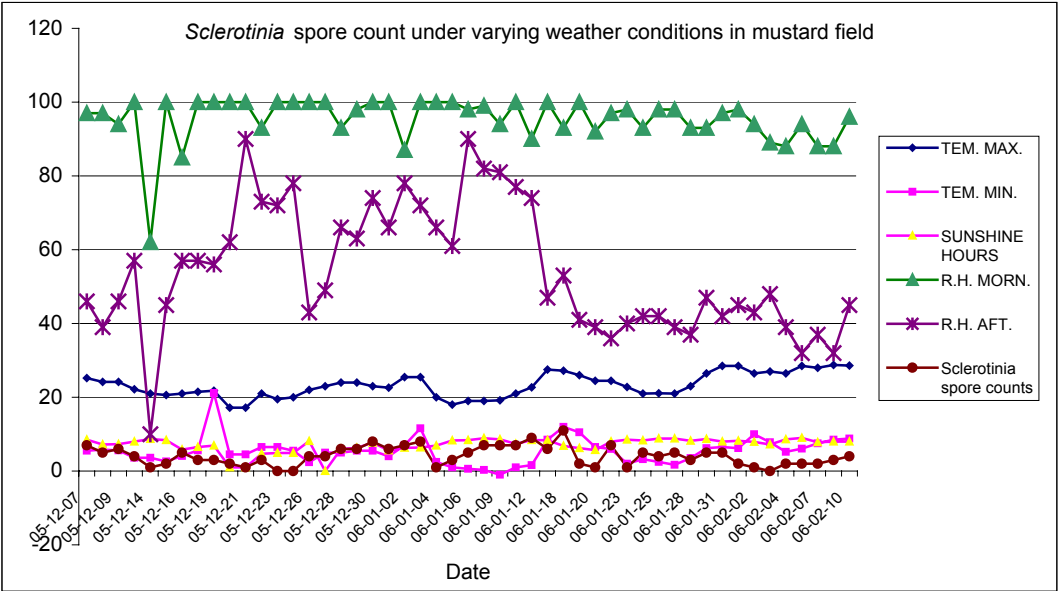


Figure 1: Relationship of different weather parameters with *Sclerotinia* infestation of petals of *Brassica juncea*

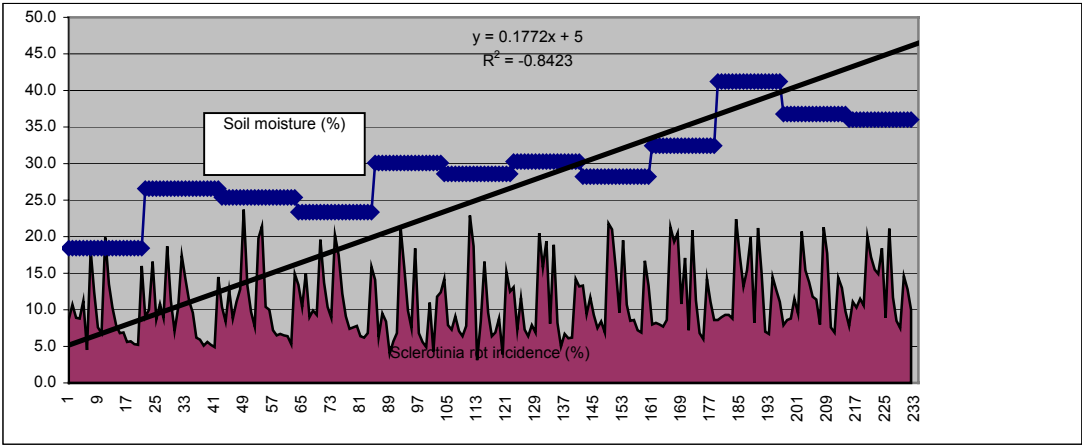


Figure 2: Relationship of *Sclerotinia* rot incidence with soil moisture

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