

Impact of Global Climate Change on Charcoal Rot of Sesame Caused by *Macrophomina phaseolina*

Muhammad Rizwan Bashir*

Oilseeds Research Institute, Ayub Agricultural Institute, Faisalabad, Pakistan

*Corresponding author: Muhammad Rizwan Bashir, Oilseeds Research Institute, Ayub Agricultural Institute, Faisalabad, Pakistan, Tel: +92-302-7047114; E-mail: mrizwan1526@gmail.com

Received date: January 24, 2017; Accepted date: January 28, 2017; Published date: February 02, 2017

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Citation: Bashir MR (2017) Impact of Global Climate Change on Charcoal Rot of Sesame Caused by *Macrophomina phaseolina*. J Horticult 4: e106. doi: 10.4172/2376-0354.1000e106

Editorial

Sesame (*Sesamum indicum* L.) is one of the most important oilseed crops in Pakistan. It was originated from East Africa and South Asia about 5000 years ago [1]. In the world, it is cultivated on an area of 8.26 million hectares with the Production of 3.31 million tons [2], whereas in Pakistan, total area under cultivation is 80 thousand hectares with an annual production of 32.4 thousand tons during 2015-16 (Pakistan Bureau of Statistics). It has high nutritional value as it contains moisture 04.0-05.3, protein 18.3-25.4, oil 43.3-44.3, saturated fatty acids 14.0, monounsaturated fatty acids 39.0, polyunsaturated fatty acids 46.0, ash 05.2-06.2, glucose 03.2, fructose 02.6, sucrose 0.2 and phytosterols 0.4% [3].

Successful production of sesame is facing numerous restraints of fungal, bacterial, viral and phytoplasma diseases owing to highly virulent aggressive strains of pathogens. Among these constrains, Charcoal rot caused by *Macrophomina phaseolina* (Tassi.). Gold is the most important one, which are a destructive soil born, polyphagus and thermophilic fungal pathogen. *M. phaseolina* is causing huge losses of about USD 146 million in Nigeria with 40-57% disease incidence whereas in Pakistan 50-75% disease incidences have been observed. However, increased growth and development rate of this pathogen results total crop failures under favourable soil and environmental conditions [4].

Appearances of black surface on stem and roots mainly at flowering stage and sudden wilting owing to sever infection are the characteristic symptoms of charcoal rot disease of sesame. The pathogen survives in soil on plant debris by producing asexual structures viz. microsclerotia and pycnidia. These asexual structures can survive in soil for more than 5-12 years in infected plant root debris by forming hard resting structures i.e., sclerotia. These microsclerotia disperse in the soil after decomposition of host tissues and enable the pathogen to survive under adverse environmental field condition. Pycnidial growth occurs on plant tissues which rupture and aseptate, ellipsoid to avoid conidia are discharged in field for successive infection [5].

Climate has a major role for the distribution of *M. phaseolina* which are thermophilic in nature and depicts significant correlation with soil and environmental factors. High temperature and moisture are favourable for disease occurrence. Reduction in the quantity of soil moisture is a significant strategy to manage the disease. Maximum

disease was observed at 25-32°C air and 23-35°C soil temperature. It is also reported that 17-24°C air and 15-25°C soil temperature played a crucial role in the development of this disease. Some other factors are also responsible for the occurrence of disease such as different pathogen races, inconsistency in disease resistance and susceptibility, soil physical and chemical characteristics which alter the interaction between pathogen and host. Therefore, it can be expected that sudden fluctuation in the environment can increase the incidence of Charcoal rot disease. The fluctuation in climatic conditions enforces the researchers to investigate the impact of soil and environmental factors on the emergence of disease.

The losses due to Charcoal rot usually depend upon conducive soil and environmental conditions, inoculum quantity and host susceptibility. Effective management strategies can be developed by understanding the role of soil and environmental conditions. No work has done in Pakistan up till now, on epidemiology of Charcoal rot of sesame and characterization of soil and environmental factors conducive for the development of disease which is necessary to decide its apt management. Correlation of soil and environmental factors with Charcoal rot will provide some baseline knowledge to develop disease predictive model. Therefore, it is dire need of the hour to investigate the impact of climatic conditions on the development of charcoal rot of disease for its timely management.

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