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Effect of Temperature, Soil Moisture and Rhizo-Microbiota of Various Crops Influence Survival and Pathogenicity of *Sclerotium rolfsii*

Krishna Ray

Krishna Ray[1], Krishnendu Sen[1,2] and Subrata Dutta[1]*

[1]Department of Plant Pathology, Bidhan Chandra Krishi Viswavidyalaya, Nadia, 741 252, West Bengal, India, [2]Department of Microbiology, Vidyasagar University, Midnapore, 721 102, West Bengal, India. Email. subratadutta1972@gmail.com

Abstract

In this study, we have investigated the effect of temperature, soil moisture content (SMC) and soil types on saprophytic colonizing ability (SCA) and pathogenicity of *Sclerotium rolfsii* on different crops. Population dynamics of pathogen along with rhizospheric microbiota were evaluated under *in-vitro*. Increase in the rate of SCA of *S. rolfsii* was observed with decrease in SMC from 100 to 60 per cent of field capacity (FC) but in SMC below than 60 per cent of FC the SCA was also decreased. Relatively highest rate of SCA of *S. rolfsii* was observed in clay loam soil having FC 36 per cent and SMC at 60 per cent of FC found to be the optimum for SCA. In case of sandy loam hilly soil, SCA was optimum at high level of SMC of 70 per cent FC. Best temperature for SCA was 30 C followed by 25 C and optimum temperature for SCA was 25-30 C. Studies on pathogenicity under pot culture indicated that, *S. rolfsii* was more pathogenic on bean and pea. It was followed by cowpea, amaranthus, spinach, jute and sugar beet. It was moderately pathogenic on tomato, cabbage, okra, groundnut, brinjal and chilli and less pathogenic on maize, cauliflower and broccoli. Enhanced soil microbial enzymatic activity and microbial population were observed in maize, cauliflower, cabbage and broccoli rhizosphere. Fluorescein diacetate (FDA) hydrolyzing activity was highest in maize followed by broccoli and cauliflower rhizosphere soil. Highest total bacterial count was observed in cauliflower followed by cabbage and maize rhizosphere. A negative relationship was observed between FDA activity and damping off on different test crops.

Key words: Field capacity, FDA, saprophytic colonization, *Sclerotium rolfsii*, temperature

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Soil borne diseases like wilts, root, stem and collar rots, damping off and seedling blight caused by fungal bacterial and nematodes are the major constraints for harnessing optimum harvest in different parts of the world. Among the different sclerotia forming pathogens *Sclerotium rolfsii* is predominant soil invaders and under favorable condition it becomes major biotic stress on vegetables and other crop production. *Sclerotium rolfsii* is the major soil-borne plant pathogen and primarily attacking the roots and lower part of the stems having wide range of hosts, but their main targets are herbaceous plants. Soil environment is extremely complex to understand the dynamic processes that may pose the rhizosphere either as play ground or battle front towards the soil-borne plant pathogens. Availability of crop residues in field increases survival and production of resting structures by soil borne pathogens. It was observed that wheat straw produce least number of sclerotia where as corn straw produced highest number of sclerotia followed by soybean straw under 70 per

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