

Cultural and Morphological Variations Among the Isolates of *Sclerotinia sclerotiorum* (Lib.) de Bary Causing Sclerotinia Rot of Rapeseed-Mustard

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Abstract

Sclerotinia rot caused by Sclerotinia sclerotiorum is one of the most common and devastating disease of rapeseed-mustard. It has been reported to infect a wide range of host plants worldwide and causes considerable yield losses upto 100 percent in favourable condition. The present study was carried out to know the cultural and morphological variations among different isolates collected from different rapeseed-mustard fields and designated as SF1, SF2, SF3 and SF4. These isolates were examined for cultural and morphological characters at 7, 14 and 21 days after inoculation. The observations of study revealed that all four isolates varied in their cultural and morphological character i.e. radial growth (mm), size, number and pattern of sclerotia. Among all isolates, SF4 (46.66 mm) took a lead in radial growth followed by SF3 (38.33 mm), SF2 (25.00 mm) and SF1 (23.33 mm) at 7 days after inoculation, while there is no difference in radial growth (90.00 mm) among these isolates after 14 and 21 days after inoculation. Sclerotia were commonly formed either at the periphery or at the centre of the Petri Plate in circular or scattered manner after 7 days of inoculation. The maximum number of sclerotia (50) was produced in SF1 isolate, while minimum (29.66) in SF3 isolate. However, largest size of sclerotia (5-15 mm) was observed in SF4 followed by SF1 (3-12 mm), SF 2 (5-10 mm) and SF3 (2.5-6 mm) isolates.

Keywords : *Sclerotinia sclerotiorum, rapeseed-mustard, cultural and morphological variations*

Introduction

Rapeseed-mustard is an important crop belong to oilseed brassica, plays a significant role in diet of people as a source of edible oil and vegetable. Several important diseases such as Alternaria blight (*Alternaria brassicae*), white rust (*Albugo candida*), downy mildew (*Perenospora parasitica*) and Sclerotinia rot (*Sclerotinia sclerotiorum*) are responsible to cause qualitative and quantities yield losses in rapeseed- mustard^[6]. Among these, Sclerotinia rot caused by *Sclerotinia sclerotiorum* (Lib) de Bary, is most serious and common threat to rapeseed-mustard. The pathogen distributed worldwide, infect over 650 plant species of diverse phylogenetic

background. It is more serious in temperate and sub-tropical regions (Purdy, 1979) with considerable yield losses (40-72%) in rapeseed-mustard under favorable condition^[2,3]. Symptoms appear as white rot or mould and soft rot on different plant parts viz., leaf, stem, root and fruit^[1,5]. The information of pathogen variability provide knowledge of aggressiveness of pathogen and help for developing resistant varieties that is one of the best economic method to overcome this problem^[4,7]. Considering the importance of pathogen variability in development of resistant varieties, the present study was undertaken.

Materials and Methods

The present investigation was carried out during *rabi* season 2015-16 under laboratory condition at Department of Plant Protection, Faculty of Agricultural Sciences, Aligarh Muslim University, Aligarh using four isolates of *S. sclerotiorum* collected from different rapeseed-mustard fields. These isolates were designated as SF1, SF2, SF3 and SF4 and surface sterilized separately in 1% (v/v) sodium hypochlorite for 2-3 min and thoroughly washed in sterile distilled water. Single sclerotia was placed on potato dextrose agar (PDA) under laminar air flow and incubated at $22 \pm 2^{\circ}\text{C}$.

Cultural and Morphological variability- Four isolates of *S. sclerotiorum* collected from different rapeseed-mustard fields were inoculated separately on Petri

Results and Discussion

The results of the study showed that all four isolates of *S. sclerotiorum* were differed in their cultural and morphological characters *viz.*, radial growth (mm), number, size and pattern of sclerotia. Among these isolates, SF4 (46.66 mm) took a lead in radial growth followed by SF3 (38.33 mm), SF2 (25 mm) and SF1 (23.33) after 7 days of inoculation, while there is no significant difference in radial growth among these isolates after 14 and 21 days of inoculation. (Table 1 and Fig 1). Sclerotia were commonly formed either at the periphery or at the centre of the Petri plate in circular or scattered manner after 7 days of inoculation. In SF1 and SF3 isolates, sclerotia developed at periphery of Petri plate in single circular rim pattern while, SF4 isolate produced sclerotia at periphery in double circular rim pattern. However, SF 2 isolate formed sclerotia in scattered pattern (Table 1).

plates containing PDA using mycelia disc of 5 mm diameter of 4 days old actively growing culture and incubated at $22 \pm 2^{\circ}\text{C}$. The cultural and morphological characters *viz.*, radial growth (mm), number, pattern and size of sclerotia were examined at 7, 14 and 21 days after inoculation.

Statistical analysis- Statistical analysis of the data was done at Department of Plant Protection AMU (Aligarh) by using mini tab in complete randomized design. The observations of experiments were calculated and computed to obtain an average of each replicate and then angularly transformed using Arcsin percentage table before preparing the ANOVA. Critical difference (CD) was calculated in single factor ANOVA at a probability level of $P = 0.05$

Maximum number of sclerotia were formed in SF1 (50) isolate followed by SF4 (46.66) and SF2 (40) isolates while, SF3 (29.66) isolate produce the least number of sclerotia . Size and shape of sclerotia also an important character which determine variability within different isolates. In all tested isolates, the shape of the sclerotia was more or less spherical to semi spherical. Largest size of sclerotia was recorded in SF4 (5-15 mm) followed by SF1 (3-12 mm) and SF2 (5-10 mm) isolates, whereas smallest size of sclerotia was found in SF3 (2.5-6 mm) isolates (Table 1). The findings of this experiment was also supported by earlier workers^[3,7]. Who studied variability on the basis of radial growth, number, size and pattern of sclerotia of different isolates of *Sclerotinia sclerotiorum*.

Table 1 Cultural and morphological variation among different isolates of *Sclerotinia sclerotiorum* of mustard

Isolates	Day after inoculation											
	7 days				14 days				21 days			
	Radial growth* (mm)	Size of sclerotia (mm)	Pattern of sclerotia	No. of sclerotia produced	Radial growth* (mm)	Size of sclerotia (mm)	Pattern of sclerotia	No. of sclerotia produced	Radial growth* (mm)	Size of sclerotia (mm)	Pattern of sclerotia	No. of sclerotia produced
SF1	23.33 (28.85)	-	-	-	90.00 (71.56)	3-12	Rim on border	50.00 (44.98)	90.00 (71.56)	3-12	Rim on border	50.00 (44.98)
SF2	25.00 (29.92)	-	-	-	90.00 (71.56)	5-10	Scattered	40.00 (39.21)	90.00 (71.56)	5-10	Scattered	40.00 (39.21)
SF3	38.33 (38.16)	-	-	-	90.00 (71.56)	2.5-6	Rim	29.66 (32.97)	90.00 (71.56)	2.5-6	Rim	29.66 (32.97)
SF4	46.66 (43.07)	-	-	-	90.00 (71.56)	5-10	Rim	25.33 (30.19)	90.00 (71.56)	5-15	Double rim	46.66 (43.07)
CD at 5%	(7.49)				(0.00)			(2.15)	(0.00)			(1.80)

Figures in parentheses are the arcsin $\sqrt{\text{percentage}}$ transformed values
 *Each value is an average of three replicates

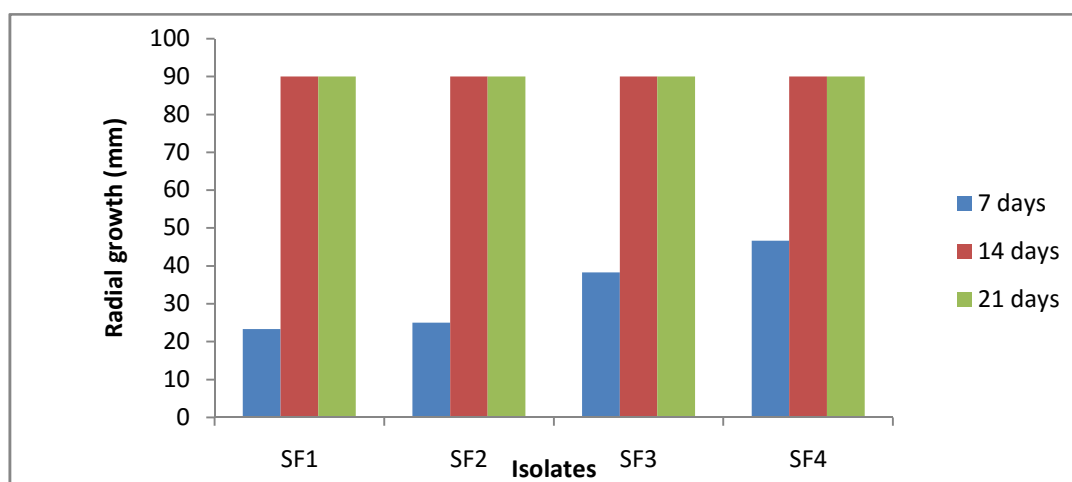


Fig. 1 Variation in radial growth of *S. Sclerotiorum* isolates obtained from different rupe seed mustard fields.

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