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Sclerotia viability of *Rhizoctonia solani* (Kuhn.) at different soil depth & condition

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Abstract
The survival of sheath blight pathogen was studied under different soil depth. The sclerotia survive for long periods and tend to accumulate in the soil. Therefore, the sclerotia of *Rhizoctonia solani* Kuhn., play an important role in the pathogen survival in rice fields. Sheath blight, caused by *R. solani*, is one of the most destructive diseases of rice in India. Sclerotia kept in small nylon bags were placed at different depths, *viz.*, 5 cm, 10 cm, 15 cm, and 20 cm depth and observed that the monthly intervals. Result was at 5 cm depth of soil was found highly viability fungus form of sclerotia in dry soil condition as compared to wet soil condition whereas, at depth of 20 cm was found less viability of sclerotia in dry soil condition as compared to wet soil condition.

Keywords: Soil depths, sclerotia, sheath blight, *Rhizoctonia solani* (Kuhn)

Introduction
Rice Sheath blight is caused by *Rhizoctonia solani* (Kuhn). This disease was first recorded from Japan (Miyake, 1910) [2]. The fungus produces brown sclerotia depending upon the environmental conditions. Sclerotia are superficial, more or less globose but flattened, white when young and becomes brown. Individual sclerotium measures up to 5mm but may unite to form large mass in culture (Ou, 1985) [3]. The fungus survives in the soil for years as hard, resistant structures. The sclerotial bodies float on the surface of the water in rice fields and when come in contact with the plant, initiates infection. The sclerotium survives for long periods and tends to accumulate in the soil. Therefore, the sclerotia of *R. solani* play an important role in the pathogen survival in rice fields. Sheath blight, caused by *Rhizoctonia solani* Kuhn., is one of the most destructive diseases of rice in India. Gangopadhyay and Chakraborti (1982) [5] noticed complete mortality of leaves of a highely suceptible rice cultivar Karuna, leading to total loss of crop due to sheath blight. The pathogens can perenate in several ways in the absense of the host. It survives' in soil as scierotia as well as thick walled lobate mycelia. *R. solani* was isolated more frequently from a fine sandy loam than either from a heavier loam or a silt loam (John son *et. al*, 1978) [6]. Sirry *et.al* (1978) [9] observed more bean damping off occurred in autoclaved sandy soil infested with R. solani than in infested clay soils. Studies also showed that certain diseases are associated with specific clay components in soil (Stotzaky, 1974) [10]. The present study was undertaken with a view to study the effect of soil depth on the survival of *R. solani* in soil.

Materials and Methods
The experiments were conducted under Poly house conditions to study the survival sclerotia of *R. solani* in soil depth. Plastic pots were filled separately with nearly two kg each of natural soil. In each pot, sclerotia kept in small nylon bags were placed at different depths, *viz.*, 5 cm, 10 cm, 15 cm, and 20 cm depth. At monthly intervals sclerotia washed with sterilized distilled water to remove soil particles. They were than surface sterilized with 0.1% Naocl solution and plated 10 sclerotia with three replication on PDA and observed for the viability of sclerotia after 48 hour.

Results and Discussion

Viability of sclerotia in different soil depth and dry soil condition was assessed on different intervals

At 5 cm depth in dry soil condition the average number of sclerotia viability (10.00) was recorded at 30, 60, 90 and 120 days intervals. At 10 cm depth the average number of sclerotia viability (10.00) was recorded at 30, 60 and 90 days interval followed by (9.33) at 120 days interval. At depth 15 cm the average number of sclerotia viability (10.00) at 30 days interval followed by (8.66), (8.66) and (6.33) at 60, 90 and 120 days intervals respectively. At 20 cm depth the average number of sclerotia viability (8.33), (7.33), (6.33) and (6.00) at 30, 60, 90 and 120 days intervals. According to Sati and Sinha, (1999) the fungus in the form of sclerotia did not survive at the depth of 2.5 cm. and 20 cm. after 240 and 300 days, respectively. Maximum survival of 330 days of the fungus was observed when sclerotia were placed at the depth of 5-10 cm.

Table 1: Sclerotia viability of *R. solani* in different soil depth at dry condition

Observation in days Interval	Number of sclerotia viability in dry soil condition				Mean
	5 cm Depth	10 cm Depth	15 cm Depth	20 cm Depth	
30 Days	10.00	10.00	10.00	8.33	9.58
60 Days	10.00	10.00	8.66	7.33	8.99
90 Days	10.00	10.00	8.66	6.33	8.74
120 Days	10.00	9.33	6.33	6.00	7.91
Mean	10.00	9.83	8.41	6.99	
Factor	SE(m)±1	CD (p=0.05)			
Factor (Days interval)	0.06	0.19			
Factor (Depth)	0.05	0.15			
Factor (Days interval x Depth)	0.11	0.34			

Average of three replications

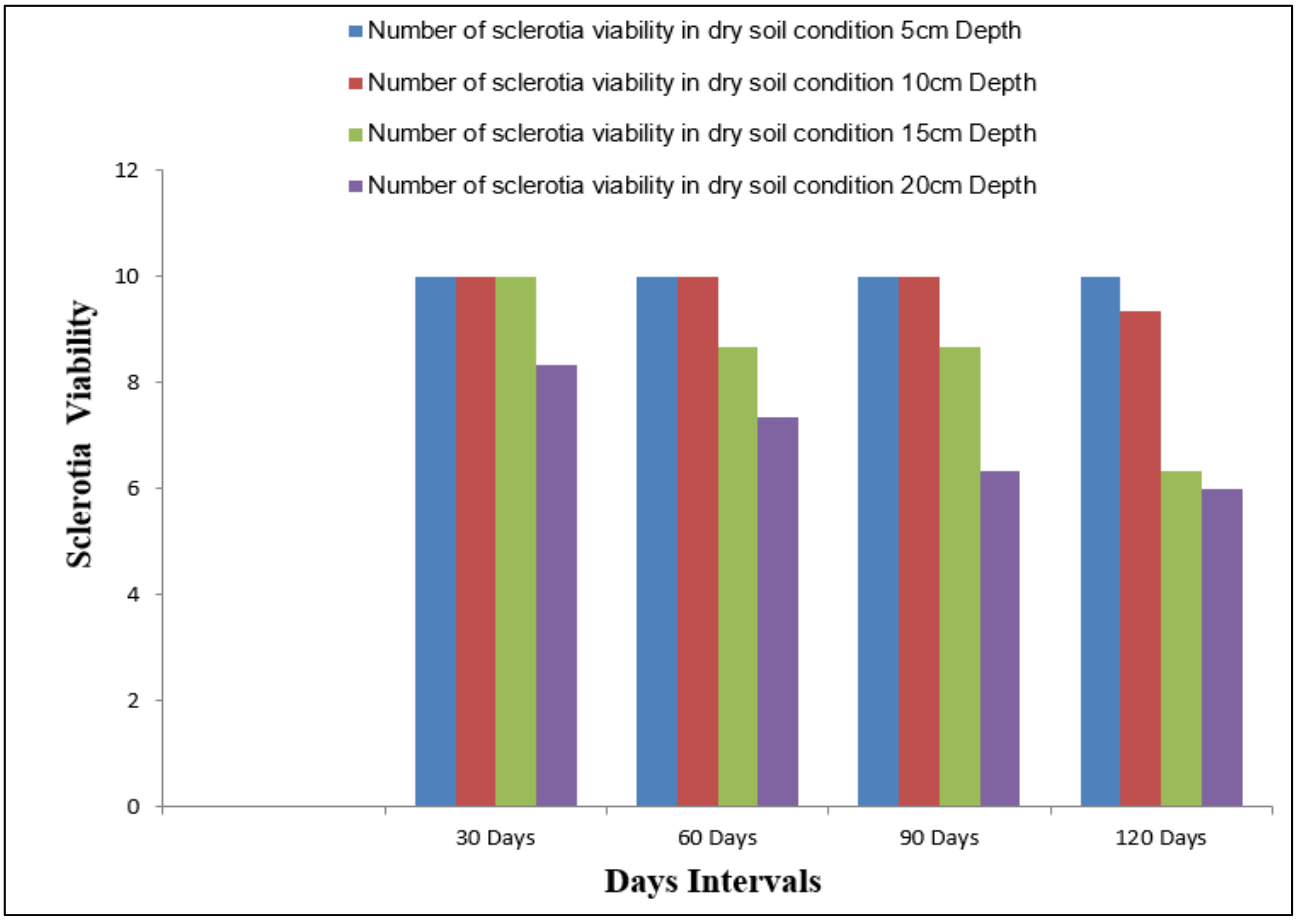

Fig 1: Sclerotia viability of *R. solani* at dry soil condition and different soil depth

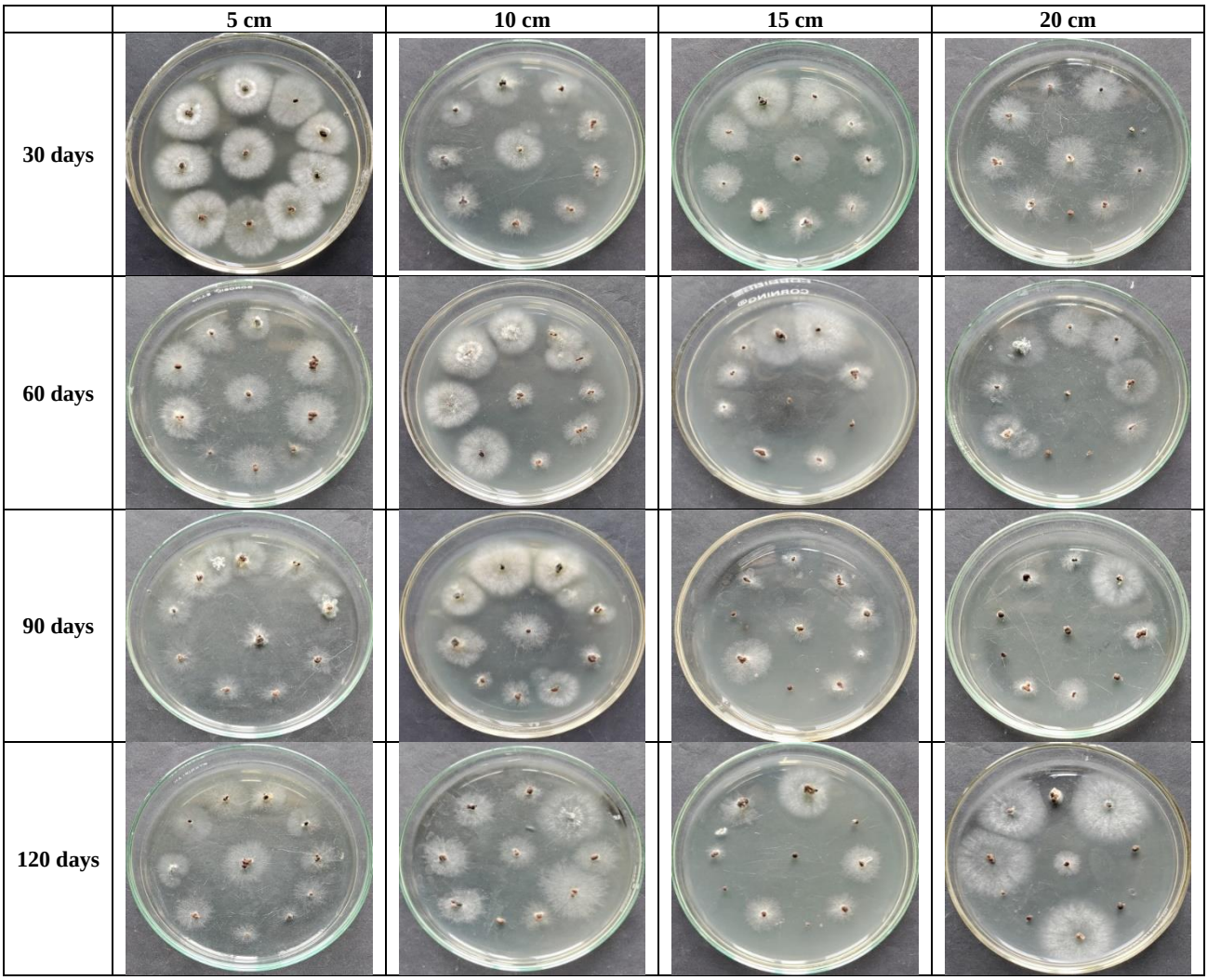

Plate 1: Sclerotia viability of *R. solani* in different soil depth at dry condition

Viability of sclerotia in soil depth and wet soil condition was assessed on different intervals

At 5 cm depth in wet soil condition the average number of sclerotia viability (9.33) was recorded at 30, 60 and 90 followed by (6.33) 120 days intervals. At 10 cm depth of soil the average number of sclerotia viability was recorded (9.00) followed by (9.33), (8.66) and (5.22) at 30, 60 90 and 120 days interval respectively. At 15 cm depth of soil the average number of sclerotia viability (7.33) followed (6.66), (6.66) and (4.66) at 30 60, 90 and 120 days intervals respectively. At 20 cm depth of soil the average number of sclerotia viability (6.33) followed by (5.33), (5.33) and (3.00) at 30, 60, 90 and 120 days intervals. Park and Berteus (1932), reported that the sclero-388 Indian Phytopathology tia of R. solani were viable only for 180 days, whereas Ou (1973), found that the sclerotia of sheath blight fungus survived in soil for one or two years.

Table 2: Sclerotia viability of *R. solani* in different soil depth at wet condition

Observation in days Interval	Number of sclerotia viability in dry soil condition				Mean
	5 cm Depth	10 cm Depth	15 cm Depth	20 cm Depth	
30 Days	9.33	9.00	7.33	6.33	8.08
60 Days	9.33	9.33	6.66	5.33	7.74
90 Days	9.33	8.66	6.66	5.66	7.58
120 Days	6.33	5.22	4.66	3.33	4.88
Mean	8.58	8.22	6.33	5.16	
Factor	SE(m)±1	CD (p=0.05)			
Factor (Days interval)	0.04	0.12			
Factor (Depth)	0.04	0.14			
Factor (Days interval x Depth)	0.08	1.28			

Average of three replications

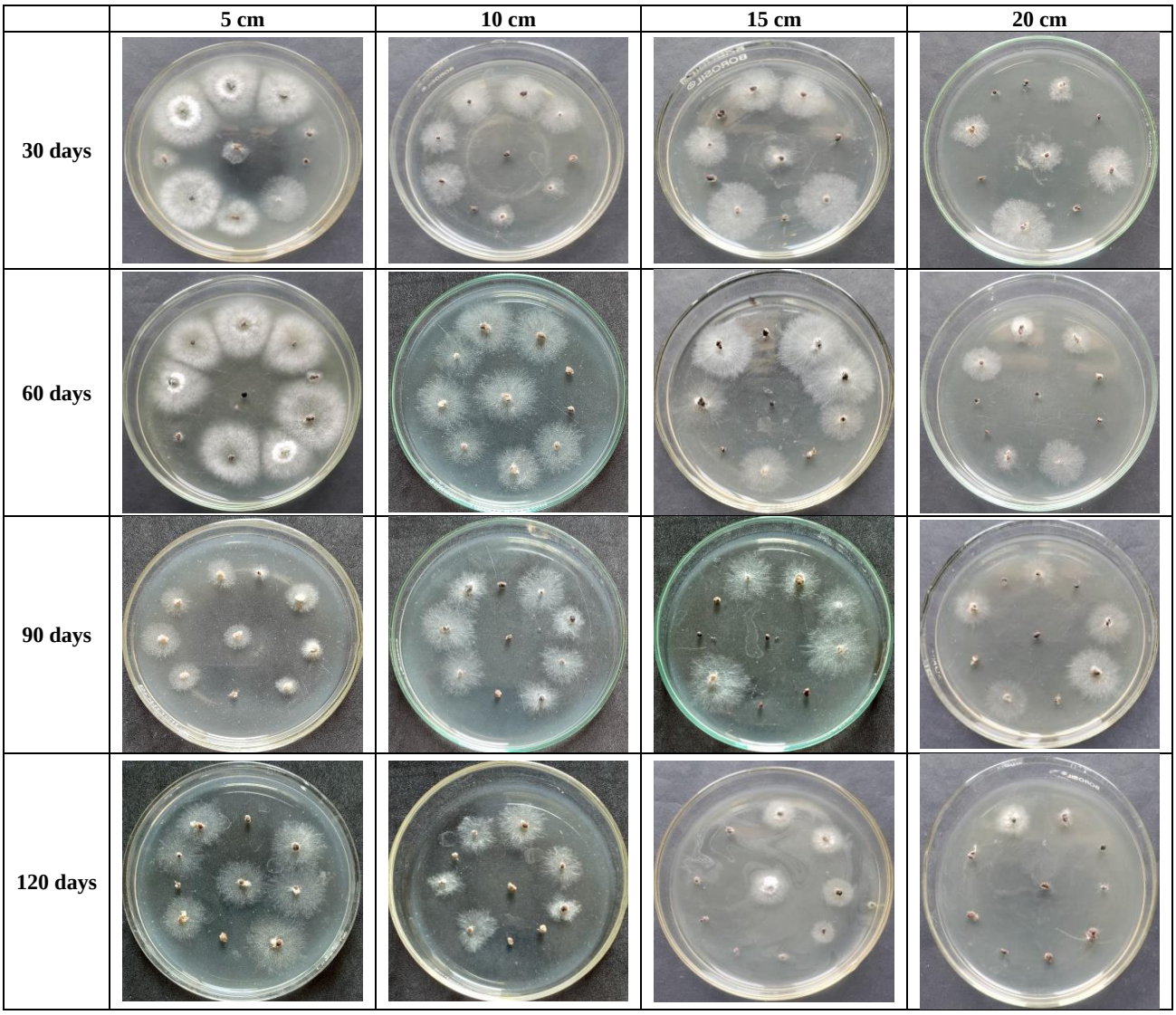

Plate 2: Sclerotia viability of *R. solani* in different soil depth at wet condition

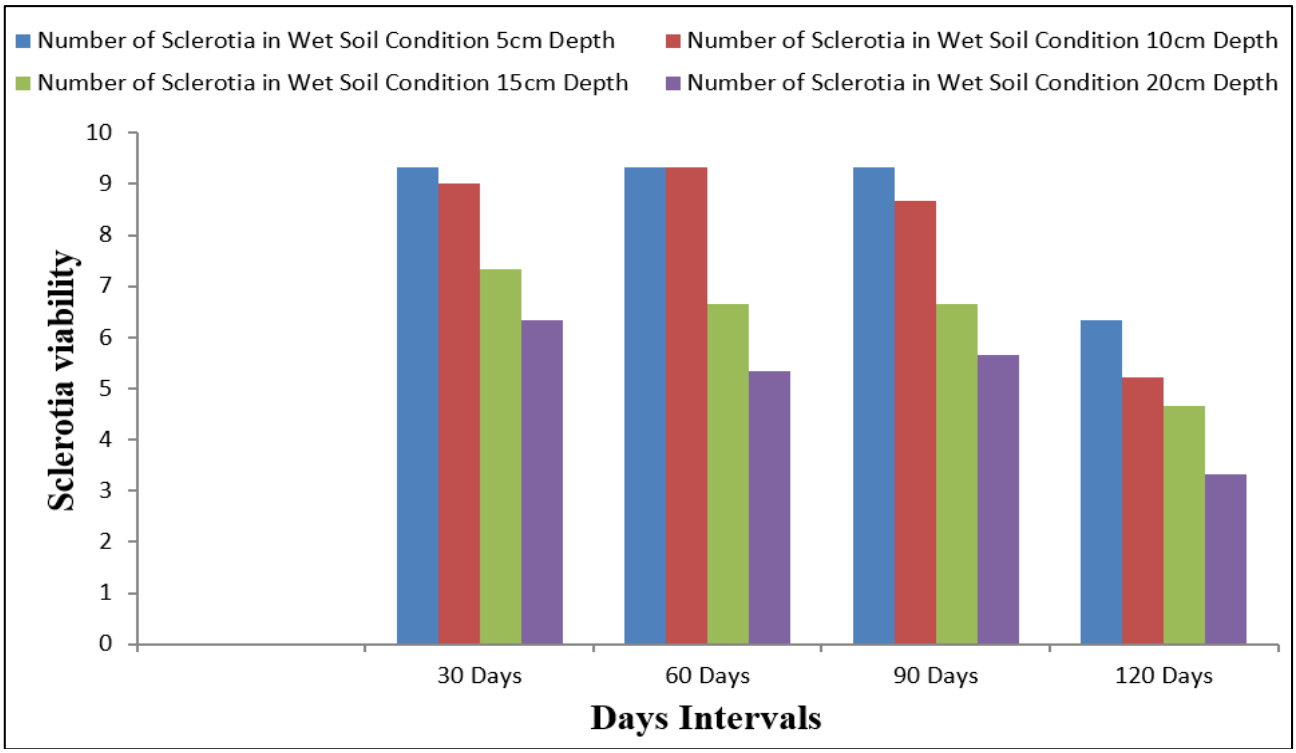

Fig 2: Sclerotia viability of *R. solani* at wet soil condition and different soil depth

Conclusion

At 5 cm depth of soil was found highly viability fungus form of sclerotia in dry soil condition as compared to wet soil condition whereas, at depth of 120 cm was found less viability of sclerotia in dry soil condition as compared to wet soil condition.

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