

Sclerotinia stem rot: A potential threats to mustard cultivation in northern Madhya Pradesh

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ABSTRACT

Sclerotinia sclerotiorum (Lib) De Bary, is the causal fungus of Sclerotinia stem rots in Mustard. This study was aim to survey the Sclerotinia stem rot affected area. Keeping in view the importance of the disease a well-planned block wise field survey of major mustard growing districts viz., Morena, Bhind, Gwalior, Sheopur and Datia were carried out during January-March 2015. The disease is emerging as a serious threat to mustard cultivation. While, the surveyed districts taken all blocks from three villages and from each village taken five field randomly selected. Surveyed village of blocks heavy disease incidence recorded in Morena (11.52%), Bhind (13.48%) and Gwalior (6.33%) were identified a shot spots but in Sheopur (2.81%) and Datia (5.00%) were recorded fewer incidences as compare to highly incidence districts. At present study of field surveys indicated that Sclerotinia stem rot has set its foot as a key position among mustard disease in Northern region of Madhya Pradesh. Sclerotinia stem rot incidence was increasing gradually year after year and emerging as a serious threat to mustard crop. The disease appears regularly become mild to severe forms in remains different Rapeseed-Mustard growing areas of Madhya Pradesh. The low incidence of Sclerotinia stem rot disease was adopting (Mustard + Wheat) cropping pattern adopted, where the sandy loam alluvial soil, while, where, adopting (Mustard + Pea), (Mustard + Chickpea) and mono crop (only mustard) grown areas were found high incidence of this disease and soil was light black to black cottony soil with less drainage facility. This disease most found in early sowing farmers' field but there was not found in late shown fields. Hence, these above points may help to make strong strategies for managing this disease with compatible integrated disease management practices.

Key words: *Sclerotinia sclerotiorum*, Indian mustard, survey, SSR and Districts.

INTRODUCTION

Sclerotinia stem rot of mustard caused by *Sclerotinia sclerotiorum* (Lib) de Bary has become an important problem in northern Madhya Pradesh. This disease locally called Polio disease in northern region of Madhya Pradesh. Earlier, sclerotinia stem rot considered as a minor problem in India but it has become a threat by the wide spread, destructive and serious problem not only India but throughout the world most mustard growing areas. Large numbers of sclerotia are formed in soil on dead organic matter, on roots, on and inside the pith of stem in rapeseed-mustard crop, that is serve as source of primary inoculum for the next season. Sclerotinia rot has become an economically important yield reducing factor especially in raya (*Brassica juncea*) and is causing 40-80 per cent losses in yield (Mehta *et. al.*, 2010). The maximum Sclerotinia rot incidence recorded in field of mustard growers of Rajasthan was 90 per cent, (NCIPM Newsletter, 2010). Sclerotinia stem rot is a disease that has become significant in recent times in India and elsewhere. Hence, the aim of present investigation was undertaken to formulate the effective strategies to manage this emerging problem.

MATERIALS AND METHODS

A total three hundred and sixty mustard fields were surveyed of northern Madhya Pradesh in January to March 2014-15 at pod formation/pod maturity stage of the crop. For such survey of all the blocks of the selected districts

were taken and from each block three villages were randomly selected. The five fields from each village were randomly selected. An area of 1 m × 1 m was marked at five randomly selected spots on each farmer's field. The numbers of diseased plants were recorded in five 1m² quadrats in each field. Plants were considered diseased if the remaining stems were bleached and shattered and/or contained sclerotia. The quadrats were placed 10-30 m from the edge of a field, usually at each of the four corners and halfway down one side. The survey deviated from this standard pattern in non-rectangular fields, but in all cases quadrat samples were widely dispersed in each field. The percent disease incidence was calculated by following formula.

$$\frac{\text{Total number of infected plants}}{\text{Total number of plants}} \times 100$$

RESULTS AND DISCUSSION

The data presented in table 1 and fig. 1 revealed that out of 360 mustard fields from all blocks surveyed in five districts, the maximum percent disease incidence was found in Gohad 18.33 and in Karahal 0.67 percent was recorded. Out of the 24 blocks, 14 blocks showed disease incidence percent in the range of 10-18 and in remaining 10 blocks the disease incidence comes under 1-10 percent. Ghasolia *et al.*, (2004) also reported that out of 640 mustard fields surveyed in 24 districts of Rajasthan, 40-60% disease incidence was recorded in 31 fields of 10 districts. In 71 fields incidence of Sclerotinia rot was 20-39% and in rest of the 538 fields < 20%. Similar result recorded by Chauhan *et al.* (1992) they reported that stem rot of mustard caused yield losses of up to 72 per cent in severe cases in Uttar Pradesh.

Disease incidence in districts varied from 2.81 to 13.48 per cent. The maximum disease incidence was recorded in Bhind 13.48 followed by Morena 11.52, Gwalior 6.33, Datia 5.00 and Sheopur 2.81. The soil type in Bhind (Deep alluvial), Morena (Alluvial), Gwalior (Clay and Loam), Datia (Sandy clay loam) and (Alluvial, Red sandy loam soil). However, irrigation sources are Dug wells, Tube wells, Pond Canal and Lift irrigation facilities are available. The maximum incidence also observed in water logged fields and the fields nearest to the canal area.

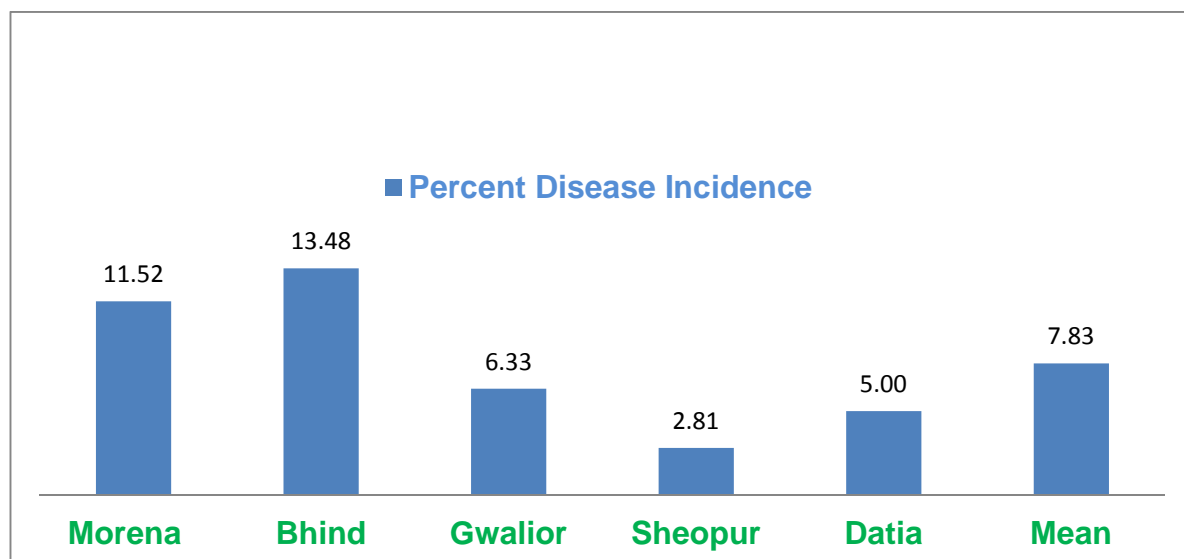
Higher incidence of disease was favoured by factors like irrigations (4-6 times), clay type soil, dense plant population, susceptible variety and continuous cultivation of mustard in that area. It was observed that the mustard varieties grown by the cultivators (Rohini, Pusa Bold, Varuna and RVM-1 series) were susceptible to stem rot disease. The crop sown between second week October to first week of November had recorded maximum percent disease incidence. However, low percent disease incidence was noticed, when the crop was sown in first and second week of October and third week of November. Sharma *et al.* (2001) worked on stem rot of mustard in Haryana reported the same trend. This may be due to the fact that in late sowing, the post flowering stage reaches by January end which does not coincide with the congenial period. All cultivars grown by farmers were found susceptible to stem rot, disease incidence ranging from 9.88% in local cultivars to 21.93% on cultivar T-59 (Varuna). It is important to note that the disease incidence was high in mixed crop (Mustard + pea) and mono culture (Mustard) but less incidence was recorded in Mustard and wheat sown crop.

During survey of mustard growing fields, it was observed that crop rotation plays an important role in reducing disease incidence. Noticed by Duczek and Morrall (1971) the sclerotinia was recorded on 18 plant species in Saskatchewan in 1970. New Canadian records were on *Solidao canadensis* var. *salebroso*, *Linum usitatissimum*, and *Lens culinaris*.+ average provincial infection rate of rape (*Brassica campestris* and *El. napus*), based on a stubble survey of 94 fields in Crop Districts 5, was 0.53%. It appears that the distribution of Sclerotinia stem rot has increased steadily since 1957 in the major rapeseed growing areas of Saskatchewan, confirmed by the Shivpuri, *et al.*, (2000), Weiss (1980). Also similar confirmation given by Dhawan *et al.* (1981).

Table 1. Incidence of Sclerotinia stem rot of mustard in undulating and plane area of Chambal and Gwalior division

Block	Villages			PDI Mean	Sown time	Soil type
	V1	V2	V3			
Bhind	16.00	8.00	7.00	10.33	Early	Deep Alluvial
Raun	15.00	2.00	7.00	8.00	Mid	
Lahar	10.00	18.00	21.00	16.33	Early	
Mehgoan	21.00	1.00	15.00	12.33	Early	
Atair	20.00	9.00	7.00	12.00	Early	
Mihona	18.00	11.00	22.00	17.00	Early	
Gohad	24.00	14.00	17.00	18.33	Early	
District Bhind				13.48		
Morena	7.00	11.00	3.00	7.00	Mid	Alluvial
Ambah	15.00	19.00	6.00	13.33	Early	
Porsa	13.00	11.00	13.00	12.33	Early	
Joura	15.00	11.00	13.00	13.00	Early	
Kailaras	13.00	7.00	5.00	8.33	Mid	
Pahadgarh	13.00	9.00	14.00	12.00	Early	
Sabalgarh	25.00	6.00	13.00	14.67	Early	
District Morena				11.52		
Barai	3.00	7.00	6.00	5.33	Late	Clay and Loam
Bhitarwar	11.00	4.00	5.00	6.67	Late	
Dabara	5.00	2.00	5.00	4.00	Late	
Morar	12.00	8.00	8.00	9.33	Mid	
District Gwalior				6.33		
Datia	5	5	11	7.00	Mid	Sandy clay loam
Bhander	8	6	1	5.00	Late	
Seondha	2	4	3	3.00	Late	
District Datia				5.00		
Sheopur	3	3	3	3.00	Mid	Alluvial, Red sandy loam soil
Vijaypur	5	3	6.25	4.75	Mid	
Karahal	0	0	2	0.67	Mid	
District Sheopur				2.81		
CD				7.214		
CV				47.079		

Soil type source: CGWB

Fig. 1 District wise percent incidence of sclerotinia stem rot in northern region of Madhya Pradesh**CONCLUSION**

Present study of field survey indicated that Sclerotinia stem rot has set its foot as a key position among mustard diseases in Northern region of Madhya Pradesh. Sclerotinia stem rot incidence in districts varied from 2.81 to 13.48 per cent. The low incidence of Sclerotinia stem rot disease was found in fields where farmers adopted (Mustard + Wheat) mixed cropping. In these fields the soil was sandy loam alluvial soil. Where in light black to black cottony soil with less drainage facilities the high incidence of disease was found in mono crop and mustard pea and mustard

chickpea mixed crop. The early sown crop favours the disease. The above facts may help to make strong strategies for managing this disease with compatible integrated disease management practices.

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