

## Epidemiology and management of *Sclerotinia* stem rot in Indian mustard (*Brassica juncea*)

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### Background:

The necrotrophic fungus, *Sclerotinia sclerotiorum* is a major disease of oilseed *Brassica* causing *Sclerotinia* stem rot (SR) all over the world and capable of infecting more than 500 host species (Sharma *et al.* 2015). Infection occurs on leaves, stems, and pods at different developmental stages, causing seed yield losses up to 80%, as well as significant reductions in oil content and quality.

### Objectives:

Knowledge of the host-pathogen interaction and environmental conditions that trigger SR outbreaks provides enough information to assess disease risk, predict the time of disease onset, determine the efficacy of fungicides and bio-agents, and optimise the timing of their application.

### Methods:

A field (19x37.5 m) of Indian mustard (*Brassica juncea* L.) was established at an experimental farm of the ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur, India (77°27' E, 27°12' N; 178.13 m MSL). The epidemiology of *Sclerotinia* rot in Indian mustard was investigated during the 2009–2022 crop seasons with seven different dates of sowing at weekly intervals starting from October 8 to November 19. Apart from daily weather data, soil moisture, percent petal infection (PPI), and disease incidence were recorded. The efficacy of different fungicides, bio-agents, and PGPRs was evaluated.

### Results:

The carpogenic infection initiated in the 52nd standard week and continued for 1 to 3 standard weeks. SR was positively correlated with an increase in soil moisture, morning relative humidity, maximum-minimum air temperature, and low bright sunshine hours (BSSH) during the flowering period. During the last 14 years, the mean daily maximum and minimum air temperatures were 18.6 and 6.1 °C, the morning and afternoon RH were 95 and 69 percent, the bright sunshine hours were 4.2, and the rainfall was 2.1 mm. Fungicide application at or after 50% bloom significantly reduced the SR incidence and improved the seed yield. During the studies, it was conclusively demonstrated that SR can be effectively and economically managed by foliar application of carbendazim, tebuconazole, *Trichoderma harzianum*, or *Pseudomonas fluorescens*. Cultural practices, including wider row spacing (45 cm) and no irrigation from December 25 to January 15, also reduce the microclimate favourable for disease development. This is a major breakthrough in determining the risk factors and, consequently, assisting growers in making fungicide spray decisions.

### Conclusions:

In the absence of epidemiological information, especially regarding weather conditions favourable for carpogenic germination and the importance of petals, aerial application of fungicides was often unsuccessful. The study could provide the growers with information about a well-timed application of fungicides to control SR, which would be economically beneficial.

### References:

Sharma, Pankaj, P.D. Meena, P.R. Verma, G.S. Saharan, Naresh Mehta, Dhiraj Singh, A. Kumar (2015). *Sclerotinia sclerotiorum* (Lib) de Bary causing *Sclerotinia* rot in oilseed *Brassicac*: A review. *J Oilseed Brassica* 6(S): 1-44.