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RESEARCH ARTICLE

Biological control of zonate leaf spot of sorghum caused by *Gloeocercospora sorghi*

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ABSTRACT

Zonate leaf spot caused by *Gloeocercospora sorghi* is one of the most destructive diseases of sorghum. The present investigation was carried out to test the efficacy of ten isolates of *T. harzianum* for their antagonistic potential against *G. sorghi* by dual culture technique *in vitro*. Th-32 isolate showed maximum inhibition of radial growth (86.1%) of the test pathogen. Volatile compounds of Th-43 isolate inhibited maximum mycelial growth of the pathogen (83.3%) followed by Th-38 (71.1%) and Th-32 (67.0%). In a seed bio-priming followed by two foliar sprays experiment, maximum increase in plant height (241.25 cm) and reduction in disease severity (37.48%) was recorded with Th-32 under field conditions.

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INTRODUCTION

Sorghum is the fifth most important cereal crop in the world after maize (*Zea mays* L.), wheat (*Triticum vulgare* L.), rice (*Oryza sativa* L.) and barley (*Hordeum vulgare* L.). Sorghum is attacked by a wide range of pathogens because of a range of environments in which it is cultivated. Zonate leaf spot caused by *Gloeocercospora sorghi* Bain and Edgerton is one of the most destructive diseases of sorghum crop in India. The disease causes damage upto 85 per cent of photosynthetic area under humid and cloudy weather conditions (Agnihotri and Pandey, 1977). The present investigation was carried out to investigate the efficacy of *T. harzianum* isolates against the pathogen *in vitro* and *in vivo.*

MATERIALS AND METHODS

Dual culture screening :

Ten *T. harzianum* isolates (Th-6, 10, 15, 25, 31, 32, 36, 38, 39, and 43) procured from Biocontrol Laboratory of Department of Plant Pathology, Pantnagar, were screened for their antagonistic potential against the pathogen following the dual culture technique (Morton and Stroube, 1955). Twenty ml of sterilized and melted Oat meal agar (OMA) was aseptically poured in a sterilized 90 mm diameter Petri plates and allowed to solidify. Five mm of 6 days old mycelial disc of pathogen (*G. sorghi*) and test biocontrol agents cut with the help of sterilized cork borer from the edge of 4 days old culture, were placed on solidified OMA in such a manner that they lie just opposite to each other (approximately 6 cm apart from each other). Inoculated petri plates were incubated for seven days at 28 ± 1^{0}C because the pathogen took a week to completely fill the Petri plate. OMA amended Petri plate and inoculated centrally with 5mm mycelial disc of pathogen served as control. Observation on inhibition of radial growth of the pathogen was recorded after 7 days. Experiments were conducted in Completely Randomized Design (CRD) and each treatment was replicated three times.

Effect of volatile compounds :

Five *T. harzianum* isolates *viz.,* Th-43, 32, 38, 36 and 31