J.Mycopathol.Res. 63(2) : 467-469, 2025, ISSN : 0971-3719 (Print), 2583-6315 (Online) 10.57023/JMycR.63.2.2025.467

SHORT COMMUNICATION

First report of *Microdochium* sp. causing leaf blight on garlic (*Allium sativum* L.) in India

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Received : 24.03.2025 Accepted : 10.05.2025 Published : 30.06.2025

Garlic (*Allium sativum* L.) plants exhibiting leaf blight symptoms were observed in several fields of Kanthalloor Hills, Kerala, India, during August 2024. By morphological and molecular characterization, the causal agent of this disease was identified as *Microdochium* sp. The isolate was sequenced and deposited in NCBI GenBank. Phylogenetic analysis revealed that the isolate was grouped with reference isolates of *Microdochium* sp. Pathogenicity test was carried out by inoculating healthy garlic plants with mycelial discs from a six-day-old fungal culture, and Koch's postulates were fulfilled by the re-isolation and identification of the pathogen. This study provides the first report of the occurrence of *Microdochium* sp. on garlic, causing leaf blight in India and worldwide.

Keywords : Garlic, leaf blight, *Microdochium* sp.

INTRODUCTION

Garlic (*Allium sativum* L.) is one of the most important bulb crops worldwide. It is used in both traditional and modern medicine for therapeutic and medicinal purposes in addition to its culinary uses. Commercial garlic cultivation in Kerala, India, is confined to Kanthalloor and Vattavada hills of Idukki district, having an annual average temperature of 23.7°C and rainfall of 1276mm (Menon *et al.* 2018). During August 2024, the garlic cultivated in Kanthalloor (Lat. 10.218097°, Long. 77.191851°) showed a characteristic blight, with 40-45% incidence. The infected leaves initially appeared water soaked and rapidly faded to bright yellow and hastily dried, resulting in a burnt appearance in the affected field (Fig.1).

MATERIALS AND METHODS

The pathogen was isolated as per the standard protocols (Rangaswami and Mahadevan, 1999). The diseased leaf samples exhibiting the characteristic symptoms were collected from the field and washed thoroughly to remove dirt. The symptomatic leaves were cut into small pieces and, surface sterilized with 1% Sodium hypochlorite for 2 to 3 min, washed with sterile distilled water. After drying, the plant samples were transferred onto potato dextrose media. The petri dishes were incubated at 25 °C at a relative humidity of 70% in a growth chamber for 5 to 6 days.

The fungal genomic DNA was extracted using a modified CTAB (Cetyl trimethyl-ammonium bromide) method for molecular identification. The ITS region of rDNA was amplified using the primers ITS1 (5'-TCC GTA GGT GAA CCT GCG G-3') and ITS4 (5'-TCC TCC GCT TAT TGA TAT GC-3') (White *et al*. 1990).

To confirm pathogenicity, mycelial discs from six days old culture were inoculated on the leaves of garlic plants grown in polybags. Ten replicates were used. The plants were covered with polythene bags to maintain high humidity and accelerate infection.

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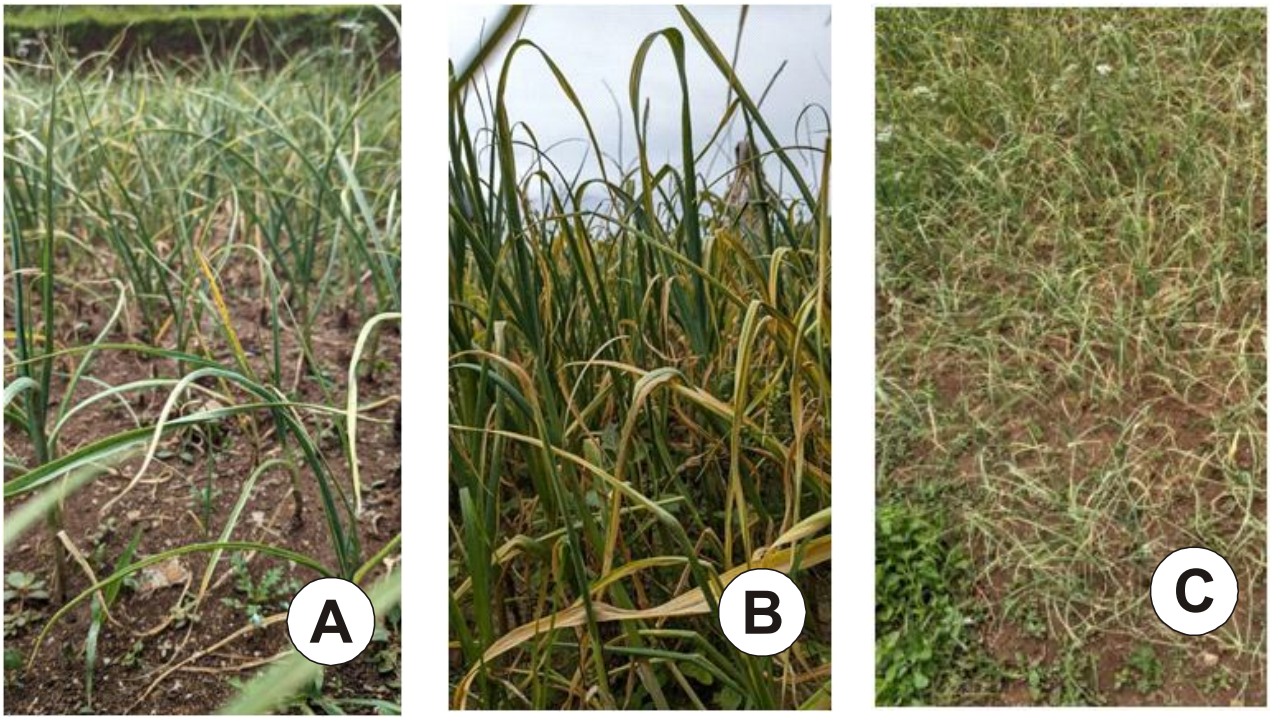

Fig 1 : Typical symptoms of garlic plants**: A.** Initial appearance of water soaked lesions, **B**. Rapid to bright yellow, **C**. Burnt appearance of the affected field

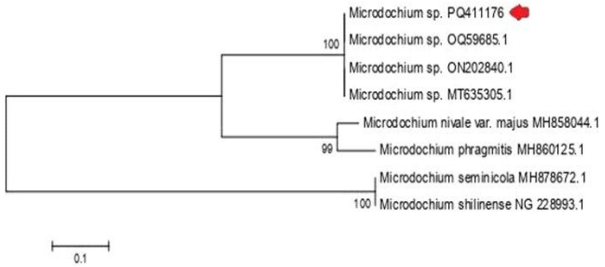

Fig 2: Phylogenetic tree constructed using MEGA11 software by neighbor-joining method with 1000 replicates for each bootstrap. NCBI GenBank accession numbers are given. The isolates marked with a red arrow were used in the study.

RESULTS AND DISCUSSION

Colonies were flat, margin entire, pinkish white with reverse light orange. The mycelium was superficial, hyphae branched, septate, hyaline, and 1.0-2.5µm wide. Conidia were fusiform, lunate, ovoid, and slightly curved with 3.0-6.5 x 2-3.5 µm.

BLASTn analysis of ITS revealed 100% molecular identity with three isolates (OQ509685.1, ON202840.1, MT635305.1) of *Microdochium* sp. Sequences were deposited in the NCBI GenBank with accession number PQ411176.

The molecular phylogenetic tree was constructed using MEGA 11 to confirm the identity of the pathogen. Phylogenetic analysis also showed that the isolate was grouped with isolates belonging to *Microdochium* sp. (Fig. 2).

The inoculated leaves exhibited symptoms nine days after inoculation similar to those previously observed in the fields. *Microdochium* sp. was reisolated and confirmed, fulfilling Koch's postulates. The control plants remained healthy.

Several species of *Microdochium* had been previously reported as pathogens of many economically important crops such as rice, sorghum, maize, barley, etc. Zhang *et al*. (2015) reported that the sparse leaf patch on turf grass was caused by *M. paspali*, which occurred during the cool season in tropical areas and had optimum growth at 25-28^{0}C. Incidence of *M. triticola* on the roots of wheat was reported by Kwasna *et al*. (2007). According to Crous *et al*. (2018), *M.*

musae was isolated from *Musa* sp. leaves. To the best of our knowledge, this is the first report of *Microdochium* sp. causing leaf blight on garlic (*A. sativum*) in India and worldwide. The disease causes severe destruction to the crop, thus demanding urgent attention towards its management.

DECLARATION

Conflict of Interest. Authors declare no conflict of interest.

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