

Case Study

<https://doi.org/10.20546/ijcmas.2017.607.409>

First Report of *Alternaria zinniae* causing Blight in *Zinnia* sp. from Kashmir, India

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ABSTRACT

Keywords

Alternaria zinniae,
Zinniae, Kashmir,
Foliar blight.

Article Info

Accepted:
29 June 2017
Available Online:
10 July 2017

Zinniae is an important flower specie cultivated in India as well as in Kashmir valley. An unusual disease outbreak was observed in the nursery beds of *Zinniae elegans*. During ascertaining the cause of the disease a new pathogen *Alternaria zinniae* not previously reported from this region was found infecting the plants causing moderate to heavy blight. During the study *Alternaria zinniae* infecting *Zinniae* sp. was reported first time in the valley of Kashmir.

Introduction

Zinniae is an old garden favorite with many cultivars. It is a bushy, leafy annual. In Kashmir valley *Zinniae* is commonly grown flower specie grown both for commercial as well as aesthetic purpose. In Kashmir valley *Zinniae* was previously reported to be effected mostly by *Cercospora zinniae*, which was considered the only major fungal disease and constraint for profitable cultivation of this flower plant.

In the present report one more fungal pathogen is being reported to cause moderate to heavy leaf blight in nursery plantation of *Zinniae* sp. Nursery laid down in faculty campus of Faculty of Agriculture Wadura was seen effected by blight symptoms which were unusual and not seen before in this region

(Figure 1). Upon microscopic observation spores of *Alternaria* sp. were found associated with the blight infection. The causal pathogen was isolated and kochs postulates were followed to ascertain pathogenicity of the cause of this disease.

Microscopic examination

The microscopic examination of the diseased tissue reveled association of a particular *Alternaria* Sp. with the disease.

The *Alternaria* spores were with a very long beak characteristic of *Alternaria zinniae* (Pape, 1942).

Isolation and purification of causal fungi

The leaf tissues partly infected were brought to laboratory surface sterilized followed with serial washings with sterile water, blotting dry with sterile blotting paper towels and were inoculated on PDA Plates (Johnston and Booth, 1983; Waller *et al.*, 1998). The fungal colony obtained was purified with both hyphal tip method (Pathak, 1972) and single spore technique (Johnston and Booth, 1983). The purified culture obtained, produced

similar spores which were associated with the diseased tissue.

Pathogenicity test

The isolated pure culture which had produced abundant spores was used to conduct this test. The spores were washed from the Petri dish with the help of sterilized distilled water. A spore load of 10^5 / ml was used to inoculate *Zinnia* plants with the help of miny sprayer.

Figure-1: Foliar blight outbreak in Zinnia nursery



Figure-2: Pathogenicity test on Host (Zinnia elegans)



At the time of inoculation

96 hours after inoculation of pathogen

Figure-3: Micrograph of conidia of Causal pathogen



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Figure-4: *Alternaria Zinniae* in culture on Potato Dextrose Agar(PDA)



The inoculated plants were kept in humidity chamber and observed daily. The symptoms started to develop after 48 hours of inoculation and after 96 hours typical blight symptoms were quite clear (Figure 2).

These infected produced similar *Alternaria* spores with typical very long beak. Upon re-isolation of the fungal from these artificially inoculated plants similar fungal colony were obtained proving all the necessary conditions of Koch's postulates.

Characters of causal pathogen

Upon identification of the fungal pathogen all the characteristics especially that of the spore ($100\text{-}200\mu \times 13\text{-}23 \mu$) having exceptionally very long beak ($54\text{-}95 \mu$) not normally seen in

other species of *Alternaria* is suggestive to the pathogen *Alternaria zinniae* (Figures 3 and 4). The spores are darker with 6-10 transverse septa and also rarely with longitudinal septa. The cultures are initially grayish black turning darker with time with dark blackish borders (Figure-4). The identification was carried out using standard literature (Pape, 1942; Anonymous, 2017).

Alternaria zinniae was first described in 1942. The first publication on the disease in the United States appears in 1943 (Diamock *et al.*, 1943), besides *Zinniae*, *A. zinniae* has been found to infect other hosts such as Sunflower, tomato, lettuce, tobacco and China aster (Wehlburj, 1969).

Although *Zinniae* is grown in Kashmir valley

from a very long time but only few pathogens were reported associated with this plant. To our knowledge *Alternaria zinniae* causing Alternaria leaf blight of *Zinniae* is not previously reported from Valley of Kashmir and present study reporting the presence of this pathogen from this region is the first one from Kashmir valley. Besides we were unable to trace presence of this causal pathogen infecting *Zinniae Sp.* in Fungi of India and in Indian Type Culture Collection as per their Catalogue of Fungal and Bacterial Collection (1936-2016).

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How to cite this article:

Bhat, K.A., N.A. Bhat, F.A. Bhat, T.A. Wani and Viswanath, H.S. 2017. First Report of *Alternaria zinniae* causing Blight in *Zinnia Sp.* from Kashmir, India. *Int.J.Curr.Microbiol.App.Sci.* 6(7): 3964-3967. doi: <https://doi.org/10.20546/ijcmas.2017.607.409>