The Pharma Innovation Journal 2023; 12(4): 30-32

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(4): 30-32

www.thepharmajournal.com
Received: 08-02-2023
Accepted: 13-03-2023

Deepali Mohapatra
Department of Plant Pathology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Shyama Sundar Mahapatra
Department of Plant Pathology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Lipikant Sahoo
Department of Plant Pathology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Corresponding Author:
Deepali Mohapatra
Department of Plant Pathology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

Helminthosporium blight of Anthurium: A first report from Odisha

Deepali Mohapatra, Shyama Sundar Mahapatra and Lipikant Sahoo

Abstract
Anthurium ranks ninth in the global flower trade and commands a fair price for both cut flowers and whole plants. As in the most other cultivated plants, Anthurium plant too is subjected to attack by various pathogens during its growth period. Among all the diseases, leaf blight disease caused by *Helminthosporium sp.* is newly emerging threat to all the Anthurium growers of Odisha. Initially typical brown spots began as a water-soaked lesion on the upper surface of the leaves, which usually developed from the tip or along the margin of the upper surface of the leaf. The size of these spots grew larger with age, until two or more spots merged and formed elongated reddish brown necrotic patches surrounded by a yellow halo. The centres of such spots eventually turned greyish white, with a small brown zone surrounding them. The pathogenicity of the isolated fungi *Helminthosporium sp.* was proved on potted Anthurium plants.

Keywords: Anthurium, foliar blight, *Helminthosporium*

Introduction
Anthurium is the latest sensation of Indian floriculture scene and is the largest genus of the monocot family Araceae, the word Anthurium refers to the tail like spadix which is the center of attraction. The Anthurium gains its fame and respected status by exhibiting its striking ensemble, which is created unitedly by its spadix and its spathe, within the economically essential ornamentals, allowing its use in interior and exterior decoration and also to its use as a cut flower. Anthurium is susceptible to a variety of illnesses caused by fungus, bacteria, and viruses in both field and protected culture (Bhatt and Desai, 1989) [9]. Anthurium leaf blight disease is caused by *Helminthosporium sp* leads to significant losses for the farmers. The quality and quantity of leaves and flowers are found to be reduced as a result of the leaf blight disease, resulting in economic losses.

Materials and Methods
The diseased leaf samples of Anthurium were collected from the garden of the Department of Floriculture and Land scaping, College of Agriculture, OUAT, Bhubaneswar (situated at 20.27^0N 85.84^0E with an altitude of 58 m above mean sea level). The leaves of Anthurium showing typical symptoms of blight i.e. circular to angular, light to dark brown spots with a dark red or blackish margin were collected. The fresh infected leaves were subjected to microscopic examination and tissue isolation for the causal agent. The symptoms on the leaves observed in nature were critically observed and recorded. The standard tissue isolation procedure was followed to isolate the pathogen. The infected leaf pieces along with some healthy portions were surface sterilized with 1:1000 mercuric chloride ($HgCl_2$) solution for 30 seconds followed by subsequent three washings with sterilized distilled water and then transferred aseptically under laminar air flow system to sterilized petri plates containing 20 ml potato Dextrose Agar (PDA) medium. Such Petri plates were incubated at room temperature (25° ± 1 °C) and observed periodically for the growth of the organism which developed from the pieces. The organism was transferred to PDA slants and incubated at 25° ± 1 °C for 7 days. This procedure was repeated 4 to 5 times to get pure culture of the pathogen.

Identification of the pathogen
A small outgrowth of the fungus was taken from the pure culture and mounted on a clean glass slide. One hundred conidia were observed under low power (10 x) objective of the microscope. The measurements *viz*, length and breadth of spores were recorded using stage and ocular micrometer. Similarly, the morphological characters of the fungus from culture were also

observed and compared with available literature. To prove the Koch's postulates for pathogenicity, Anthurium plants raised in earthen pots were sprayed with distilled water. They were then covered with polythene bags for 24 hrs. The spore suspension from 10 days old culture was prepared in sterile distilled water. The spore suspension was inoculated on plants by pin pricking method. Similarly control plants were inoculated with sterile distilled water for comparison. The seedlings were covered with polythene bags and incubated for 3 days; the polythene bags were removed and the seedlings were kept under greenhouse condition. Regular observations were taken for the appearance and development of symptoms. The symptoms appeared within 15 days. Re-isolations were made from the affected tissues. The isolates thus obtained were compared with the original cultures for confirmation.

Result and Discussion

Symptomatology

The symptoms comprised of black or brown, sunken spots on Anthurium leaves. Initially water soaked, small, round to oblong, brown coloured spot appeared on the upper surface of the leaves. The size of these spots increased with age and finally two or more spots coalesced and developed into elongated reddish brown necrotic patches surrounded by yellow colour zone. The centres of such spots finally turned greyish white with narrow brown zone around the spots surrounded by yellow halo. These spots rapidly enlarged, became watery, turned brown to black, and totally encompassed the spadix. The spadix eventually fell off.

Isolation and Identification of Pathogen

A total ten times isolation was repeated to confirm the association of the pathogen with the disease. Tissue isolation from infected leaves resulted in getting pure culture of *Helminthosporium sp*. The cultures were further purified using the single spore isolation technique and was maintained on Potato dextrose agar (PDA) for further investigation.

The pathogen was identified on the basis of morphological characters and cultural characters like colour and shape of mycelial growth, size and shape of conidiophores and conidia. The fungus *Helminthosporium sp.* in pure culture produced colonies with profuse cottony mycelium, initially white, later turning in to an ashy black colour mycelial mat, fluffy in margin, regular distinct rings which were produced after 10-12 days of inoculation. The mycelium was septate and hyaline.

Pathogenicity

Pathogenicity test was carried out for *Helminthosporium sp.* by pin pricking the 4 leaves of potted healthy anthurium plants with the spore suspension of the isolated pathogens. Control plants were inoculated with only sterile distilled water. The plants were covered with polythene bags for 15 days. After 2 weeks the typical symptoms appeared on the inoculated leaves. Critical observation showed that the leaves inoculated with *Helminthosporium sp*. appeared as a reddish brown necrotic patche that eventually merged to give a blighted appearance and surrounded by a yellow halo. Thus the isolated *Helminthosporium sp*. was proved to be pathogenic to Anthurium beyond doubt, satisfying the Koch's postulates. The present finding of a disease on Anthurium caused by *Helminthosporium sp*. Appears to be a first report in India.

Fig 1: Initial symptoms of Leaf Blight of Anthurium

Fig 2: Later Stage of Leaf Blight symptoms on Leaf

Fig 5: Pure culture of *Helminthosporium sp.*

Fig 6: Healthy control plant after 15 days of inoculation with *Helminthosporium sp.*

Fig 7: Symptoms observed on artificially inoculated plant wih *Helminthosporium sp.* after 15 days

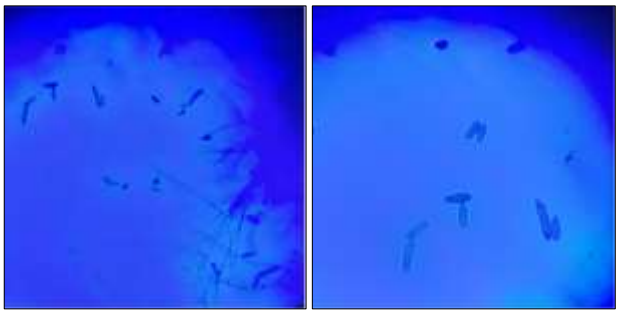

Fig 8: Microscopic photograph of *Helminthosporium sp.* showing mycelium and conidia

References

1. Minoru A, Kamemoto H, Machie K, Maeda N. *Anthracnose* resistance in *Anthurium*. Hawaii Agricultural Experiment Station, University of Hawaii; c1968.
2. Munjal RL, Gupta JN. Anthracnose of *Celosia argentea* var. Cristata in Delhi, Indian Phytopath. 1965;18:218-220.
3. Manamgoda DS, Rossman AY, Castlebury LA, Crous PW, Madrid H, Chukeatirote E, *et al*. The genus Bipolaris Study in Mycology, IMA fungus, 2014;79:221-288.
4. Sharma-Poudyal D, Duveiller E, Sharma RC. Effects of seed treatment and foliar fungicides on *Helminthosporium* leaf blight, Journal of Phytopathology. 2005;153(7):401-408.
5. Sonavane P, Devi TP, Raju J. Taxonomic studies on cultural and morphological characters for re-evaluation in *Helminthosporium species* complex, International Journal of Life Sciences. 2004;4:36-41.
6. Taj A, Naik BH, Kumar VBS. Growth, developmental features and flower production of *Anthurium andreanum* lind. in tropical conditions, Scientia Horticulturae. 2013;98(1):25-35.
7. Tsuchiya T, Takada M. Chromosome studies in five species of Araceae Chromosome Inf. Ser. 1962;3:36-38.
8. Tulsi. Taxonomic studies on *Helminthosporium graminicolous* species, Nippon Kingakukai Kaiho. 2016;41:105-118.
9. Bhatt VP, Gireesan K, Desai CF. Electrooptic properties of polycrystalline SnSe thin films. Crystal Research and Technology. 1989 Feb;24(2):187-192.