

Full Length Research Paper

First report of Anthracnose/collar rot caused by *Colletotrichum dematium* on statice (*Limonium sinuatum*) in Pakistan

Abdul Rehman^{1*}, Saira Mehboob², Chrys Akem³, Asia Batool² and M. Idrees²

¹Department of Plant Pathology, University of Agriculture, Faisalabad 38040, Pakistan.

²Plant Pathological Research Institute, Ayub Agricultural Research Institute Faisalabad, Pakistan.

³Department of Employment, Economic Development and Innovation, Queensland, Australia.

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During the month of March 2011, the incidence of anthracnose caused by *Colletotrichum dematium* on statice grown as ornamental plants at Ayub Agricultural Research Institute Faisalabad, Pakistan, was recorded. The characteristic symptoms were first, brownish spots on leaves and branches, and then drying of branches starting from plant tips down to the collar region, causing collar rots and leading to the death of the whole plant. *C. dematium* was consistently isolated from infected plants. This is the first report of anthracnose caused by *C. dematium* on statice plants in Pakistan.

Key words: Statice, anthracnose, collar rot, *Colletotrichum dematium*.

INTRODUCTION

Statice (*Limonium sinuatum*) also known as sea lavender belongs to the family Plumbaginaceae and is grown in Pakistan as a seasonal ornamental plant around the edges of lawns (Chung et al., 2005). The plant has beautiful clustered flowers of various colors which are used in bouquets, as cut flower and in dry flower arrangements. It originated from the Mediterranean; the commonly known name (statice) originated from Greek word meadow. Statice is attacked by several diseases like anthracnose, damping off, leaf spot or Cercospora blight, Botrytis blight, bacterial rot, Phytoplasma, tobacco mosaic virus, Algerian latent virus and turnip mosaic virus. Among these, anthracnose which is caused by *Colletotrichum dematium* causes a considerable loss to this ornamental flower (Masashi et al., 2009; Chang et al., 1996; Bhanumathi and Ravishankar, 2007).

Recently, this beautiful flower started showing wilting symptoms on leaves and branches and die-back of the whole plant, and the affected plants died within a week. Symptoms of collar rot were also observed on affected plants at the final stages of plant death (Figures 1, 2 and

3).

MATERIALS AND METHODS

Statice plants exhibiting wilting and dying symptoms were collected from lawns of the Ayyub Agriculture Research Institute, Faisalabad, Pakistan, and taken to the laboratory of the Plant Pathology Institute for isolations to establish the cause of the symptoms observed. Small pieces from leaves, stems and collar portions of symptomatic plants were cut and surface-sterilized by dipping in 70% ethyl alcohol for 1 min and subsequently washed with sterilized distilled water and then placed on sterile filter paper to dry up. The dried pieces were aseptically plated onto potato dextrose agar (PDA) medium using a sterilized forceps and incubated at 25±1°C in a growth chamber.

RESULTS AND DISCUSSION

Fungal colonies developed on the plated pieces and were further purified on potato dextrose agar (PDA) slants and incubated at 25±1°C, under 12 h light and dark cycles for spore development. The sporulating fungal colonies were identified using the procedure described by Kulshrestha et al. (1976) and Bebvo (2004).

Traditionally, identification and characterization of

*Corresponding author. E-mail: arb041@gmail.com.



Figure 1. Diseased (right) and healthy plants (left) of statice in lawn.



Figure 2. Diseased (right) and healthy (left) plants of statice brought to the lab for isolations.



Figure 3. Close-up of plants showing collar rots on base of static plant.

Colletotrichum species have been based on morphological characters, such as size and shape of conidia and appressoria, existence of setae, the teleomorph state and cultural characters such as colony colour, growth rate and texture (von Arx, 1957; Smith and Black, 1990; Damm et al., 2010). Colony characters identified were acervuli occurring singly or in groups (Figures 4 and 5); numerous setae that were blackish brown to dark black, and longer than the conidial masses. Conidia were hyaline, aseptate with mean dimensions of $22.0 \times 4.4 \mu\text{M}$ (Figure 4b). Conidial masses were white to dull white and then became pale orange or bright orange. Mycelia were mostly absent, but when present were fine, shiny or whitish in colour (Damm et al., 2009).

According to Sutton (1992), colonies of *C. dematium*

are very variable with white to pale mouse-grey or grey-vinaceous patches with abundant setae and black, conical sclerotia. Conidia are formed in olive-grey to light vinaceous-salmon masses, and are 18 to 26×2 to $3 \mu\text{M}$, falcate, fusiform, and gradually tapered to each end (Sutton, 1992). Appressoria are medium brown, clavate, ovate to irregular, margin entire or slightly irregularly lobed (Sutton, 1992). Bobev et al. (2009) reported *C. dematium* (spores mean sizes: $22 \times 4.5 \mu\text{M}$, ranging from 18.3 – 25×4.2 – $5.8 \mu\text{M}$). Identification within the genus *Colletotrichum* is complicated as species have few distinguishing morphological characters, and because teleomorphic stages are rarely formed (Hyde et al., 2009, 2009a).

Furthermore, the pathogenicity of the isolated fungus

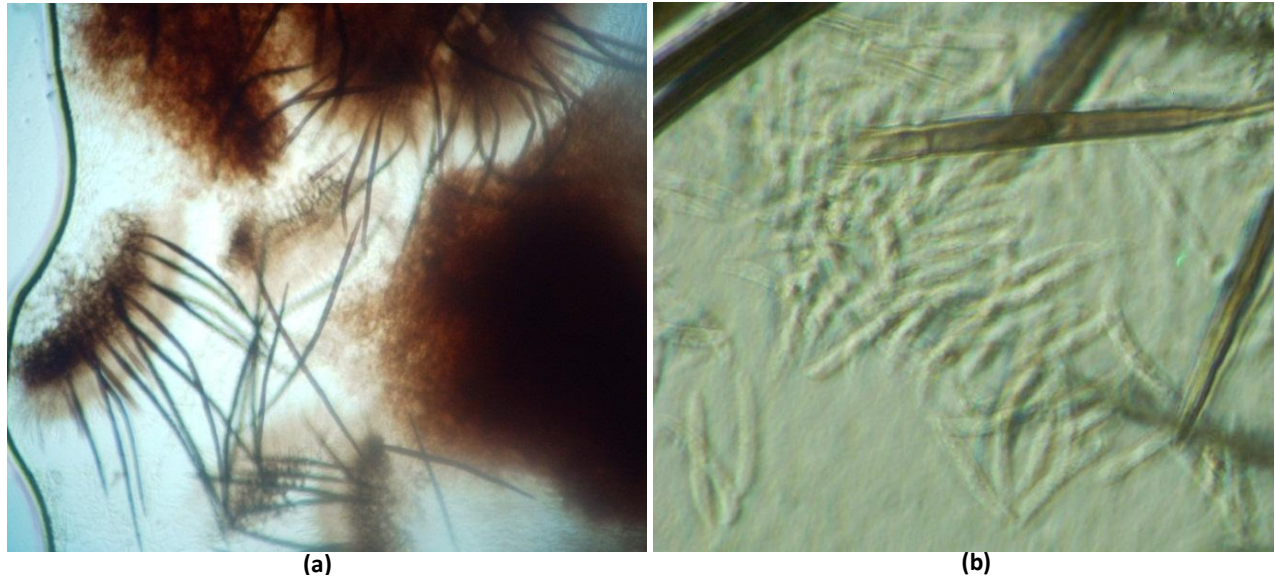


Figure 4. (a) A group of acervuli of *Colletotrichum dematium* isolated from static infected plants; (b) the hyaline conidia of *C. dematium*.



Figure 5. Hyaline, aseptate conidia with acervuli showing dark brown to black setae.

was carried out in the greenhouse on two-months old static plants using a conidial suspension of the fungus at a concentration of 1×10^6 conidia per ml. Plants sprayed with sterilized distilled water served as controls. After two weeks, plants sprayed with the fungal suspension exhibited the typical symptoms of anthracnose on leaves and branches, and after a further two weeks, collar rot symptoms were also observed at the plant bases. To complete Koch's postulates, *C. dematium* was re-isolated from the symptomatic artificially inoculated plants. Control plants sprayed with sterilized distilled water remained healthy. It was observed that symptoms produced in artificially inoculated plants were wilting, drying of branches, die-back, collar rot and death of whole plant similar under field conditions. Similarly, Washington et al. (2006) recorded the occurrence of *C. dematium* for the first time on spinach in Australia, confirmed its pathogenicity and its host range.

In conclusion, the isolate of *C. dematium* has been deposited in the national fungal culture collection of Pakistan (NFCCP) at the Department of Plant pathology, University of Agriculture Faisalabad, as isolate # 5777 A.

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