

CERATOCYSTIS FIMBRIATA ISOLATED FROM VASCULAR BUNDLES OF DECLINING MANGO TREES IN SINDH, PAKISTAN

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Abstract

Ceratocystis fimbriata is being considered as one of the contributing factors in case of mango decline. It is a widely distributed; plant pathogenic fungus which causes wilt and canker on many woody hosts. Recently *C. fimbriata* was reported in Mango Decline from Oman and now it has been for the first time isolated from declining mango trees from Sindh, Pakistan. Morphological characteristics show perithecia brown to black with globose base, necks almost 800-900 μm long with ostiolar hyphae. Ascospores elliptical 4-8 x 2-5 μm , hyaline, non septate, hat shaped appearance. Conidiophores hyaline, septate upto 150 μm long. Conidia cylindrical, sometimes in chains, truncate at the ends.

Introduction

Mango (*Mangifera indica* L.) is facing sudden decline for the last few years. The disease is spreading in all mango growing areas around the world. Many pathogenic fungi and some predisposing factors are contributing as the cause of the disease. Fungi which have been studied in association with mango decline in Pakistan include *Phytophthora* sp., *Fusarium* sp., *Botryodiplodia theobromae* (Khanzada *et al.*, 2004). Predisposing factors of the decline disease include uncontrolled irrigation, intercropping, wounding of trees, improper fertilization of soil etc., (Malik *et al.*, 2004). Recently *Ceratocystis fimbriata* was considered to be associated with decline of mango in Oman (Wyk *et al.*, 2005).

Ceratocystis fimbriata is widely distributed, plant pathogenic fungus which causes wilts and cankers on many woody hosts (Jason *et al.*, 2005). *Ceratocystis fimbriata* belongs to class Ascomycetes, order Ophiostomatales and family Ophiostomataceae. The fungus is widely distributed throughout the world and consists of numerous morphological, physiological and pathological strains. The fungus is able to sporulate on wood and wood products and spores can be vectored by numerous non specific insects.

The pathogen primarily infects through fresh wounds on the trunk or branches and rapidly invades the rays. The fungus produces asexual (*Thielaviopsis*) and sexual fruiting bodies (perithecia) on the surface of cankers and also on the cut surfaces of infected woods. Both types of fruiting bodies produce sticky spores that are easily spread by insects (Hinds, 1972).

A survey was conducted in the Sindh Province of Pakistan in April, 2006 and the pathogen is being reported for the first time on mango in Pakistan.

Materials and Methods

The samples were taken from the mango orchard of Mr. Ghulam Haider Talpur, Tando Jam, Sindh. A 5 sq. inches portion from the collar region of five infected mango

trees showing 50-60 % disease severity was cut with a sharp axe until the vascular bundle was exposed. The samples were taken as small chips with grey to black strip like fungal lesions. These infected chips were cut into small pieces and after surface sterilization with ethanol were placed in 9 cm diameter Petri dishes containing moist Whatmann filter papers. The plates were then incubated at 25°C until sporulation occurred. When the wood tissues showed a little growth they were transferred to PDA plates. The plates were incubated for three days and were subjected to microscopic observation. For identification of pathogen, the direct microscopic slides were made from woody tissues on moist filter paper as well as from culture in Petri plates. A 5 mm plug was taken from the culture and was examined under the microscope. Morphological characteristics such as mycelium color and form, ascospores, conidia, perithecia were observed and their measurements were taken.

Results and Discussion

Black streaks like fungal lesions were observed on the vascular bundles of the infected mango trees which under the microscope showed the presence of black to brown perithecia with long necks. Conidiophores were hyaline and septate. Ascospores elliptical with gelatinous sheath, giving a hat shaped appearance. Conidia cylindrical, sometimes in chains, truncate at the ends

The morphological characteristics on PDA medium indicated perithecia brown to black with globose base, necks almost 800-900 μm long with ostiolar hyphae. Ascospores elliptical 4-8 x 2-5 μm , hyaline, non septate, hat shaped appearance. Conidiophores hyaline, septate upto 150 micrometer long. Conidia cylindrical, sometimes in chains, truncate at the ends. The fungus has been identified as *Ceratocystis fimbriata* after reference to Morgan-Jones (1967) and CAB International (Anon., 2001).

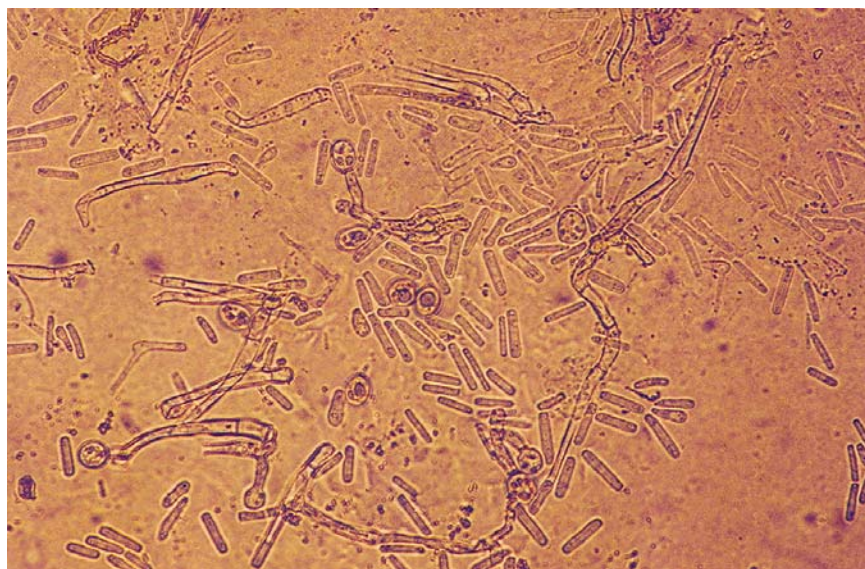


Fig. 1. Conidia of *Ceratocystis fimbriata* from vascular bundles of infected mango trees (x400).



Fig. 2. Conidia of *Ceratocystis fimbriata* on PDA medium (x1000).

References

- Anonymous. 2001. *Ceratocystis fimbriata* (original text prepared by C. J. Baker and T.C. Harrington). In: *Crop Protection Compendium*. CAB International, Wallingford, UK.
- Hinds, T.E. 1972. Insect transmission of *Ceratocystis* species associated with aspen cankers. *Phytopathology*, 62: 221-225.
- Malik, M.T., A.M. Dasti and S.M. Khan. 2004. Some manageable predisposing factors of collar/stem rot of mango (*Mangifera indica* Linn.) *Pak. J. Phytopathol.*, 36(1): 37-42.
- Morgan-Jones, G. 1967. *Ceratocystis fimbriata*. C.M.I. descriptions of pathogenic fungi and bacteria. No. 141. Kew, Surrey, United Kingdom: Commonwealth Mycological Institute. 2 p.
- Jason A.J., T.C. Harrington and C.J.B. Engelbrecht. 2005. Phylogeny and taxonomy of the North American clad of the *Ceratocystis fimbriata* complex. *Mycologia*, 97(5):1067-1092.
- Sinclair, W.A., H.H. Lyon and W.T. Johnson. 1978. Diseases of trees and shrubs. *Ithaca*, New York: Cornell University Press 474 p.
- Wyk M.V., A.O. Al-Dawi, B.D. Wingfield, A. M Al-Subhi, M.L. Deadman and M.J. Wingfield. 2005. DNA based characterization of *Ceratocystis fimbriata* isolates associated with mango decline in Oman. *Australasian Plant Pathology*, 34: 587-590.

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