



First report of *Alternaria alternata* causing leaf blight disease on *Artabotrys hexapetalus* from Uttar Pradesh, India

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Abstract

A severe leaf blight disease was observed for the first time on *Artabotrys hexapetalus* in Lucknow (Uttar Pradesh), India during 2012. Based on morphological characteristics and pathogenicity, the pathogen was identified as *Alternaria alternata*. This is the first report of *Alternaria alternata* causing leaf blight disease on *Artabotrys hexapetalus*.

Key words – *Alternaria alternata* – *Artabotrys hexapetalus* – leaf blight disease – new record

Introduction

Artabotrys hexapetalus (L.f.) Bhandari (Annonaceae), an angiospermic shrub commonly called manoranjini, is found in India and its flowers are famous for their exotic fragrance. It is distributed in India, Sri Lanka, Java and South China. Within India it is indigenous to South India and is very commonly cultivated in gardens throughout the country for its fragrant flowers. In southern parts of China, the plant is used in traditional Chinese medicine for the treatment of malaria (Li et al. 1997) and scrofula (Li & Yu 1998). The root contains an antimalarial agent (Khare 2007) and the leaves show anti-implantation/anti-fertility activity (Johri et al. 2009).

The purpose of this study was to identify a fungus causing leaf blight disease on *Artabotrys hexapetalus*.

Materials & Methods

Diseased plants were regularly observed, and infected leaves were collected from BSIP Campus, Lucknow (26.8656° N, 80.9364° E) during September 2012, carried to the laboratory, and processed by following the standard techniques (Hawskworth 1974, Savile 1962). Photographs of infection spots on host leaf were taken using a Sony DSC-5730 camera. Specimens for microscopic observation were prepared by hand-cut section and scrapes from the infected leaves. The material was mounted in water and lactophenol mixture on glass slides. Observations were made with an Olympus BX-51 light microscope and microphotographs taken using a Syntek USB camera. The microphotographs were stored in electronic format TIF. Morphotaxonomic determinations were done by comparing with allied taxa and by consulting the current literature pertaining to taxonomy

of *Alternaria*. Koch's postulates were also performed to prove pathogenicity on the host. The specimen of *Alternaria alternata* has been deposited in the Ajrekar Mycological Herbarium, (AMH-MACS-ARI), Agharkar Research Institute, Pune, India (Accession No. AMH-9514) and a part of the same was retained in BSIP Herbarium (BSIPMH-001), Lucknow, India. The systematics position of the taxa is given in accordance with Cannon & Kirk (2007), Kirk et al. (2008) and Farr & Rossman (2015).

Results

Since 2011, during rainy seasons (July to September), foliar symptoms were regularly observed on *Artabotrys hexapetalus* in BSIP Campus, Lucknow districts of Uttar Pradesh province, India. The disease first appeared in mid-July, was widespread from the end of August, September through October.

The symptoms of disease initially began from margin of the leaves as small light brown irregular spots (2–9 mm diameter), which later spread over the entire leaf surface (Fig 1a, b, c). Sometimes symptoms occurred between the middle part of the leaves. In severe infection diseased portions coalesced to form larger necrotic areas leading to drying and falling of the leaves. Symptoms, sporulation pattern, conidiophores and conidial morphology were examined. The fungus showed the following characteristics.

Infection blights hyphogenous i.e. on lower surface, circular to irregular, initially 2–9 mm, beginning from margin and spreading over entire leaf surface at maturity, necrotic, brown. *Colonies* hypophyllous, effuse, brown. *Mycelium* internal. *Stromata* present, pseudoparenchymatous, 10–18 µm wide. *Conidiophores* macronematous, fasciculate (2–10 in fascicles), straight, simple, cylindrical, thick-walled, smooth, 1–4 transversely septate, brown, 20–(40)–60 × 2.5–(3.5)–4.5 µm. *Conidiogenous cells* integrated, terminal, sympodial, polytretic, bearing thickened scars (1.5–2.5 µm). *Conidia* simple, acropleurogenous, solitary to catenate, dry, obclavate to ellipsoidal to ovoid (muriform), rostrum/beak present, 2–5 transversely septate and 1–3 obliquely septate, brown, base obtuse, 20–(50)–75 × 5–(10)–15 µm, hilum thickened (0.5–1.0 µm).

Material examined – India, (U.P.), Lucknow, BSIP Campus, on living leaves of *Artabotrys hexapetalus* (L.f.) Bhandari (Annonaceae), 2 September 2012, coll. Shambhu Kumar, AMH-9514, BSIPMH-001.

Discussion

On the basis of fungus morphological characteristics and pathogenicity, the pathogen was identified as *Alternaria alternata* (Ellis 1971, Simmons 2007). *Alternaria alternata* is an ubiquitous fungal pathogen reported globally on different hosts. However, it has apparently not been reported to cause leaf blight disease on *Artabotrys hexapetalus* from any part of the world (Farr & Rossman 2015) or from India (Bilgrami et al. 1979, 1981, 1991, Butler & Bisby 1954, Jamaluddin et al. 2004, Sarbhoy et al. 1975, 1986, 1996). The severity of this leaf blight disease probably warrants control measures. Thus, leaf blight disease of *Artabotrys hexapetalus* caused by *A. alternata* is the first report from India as well as the first worldwide record on this host.

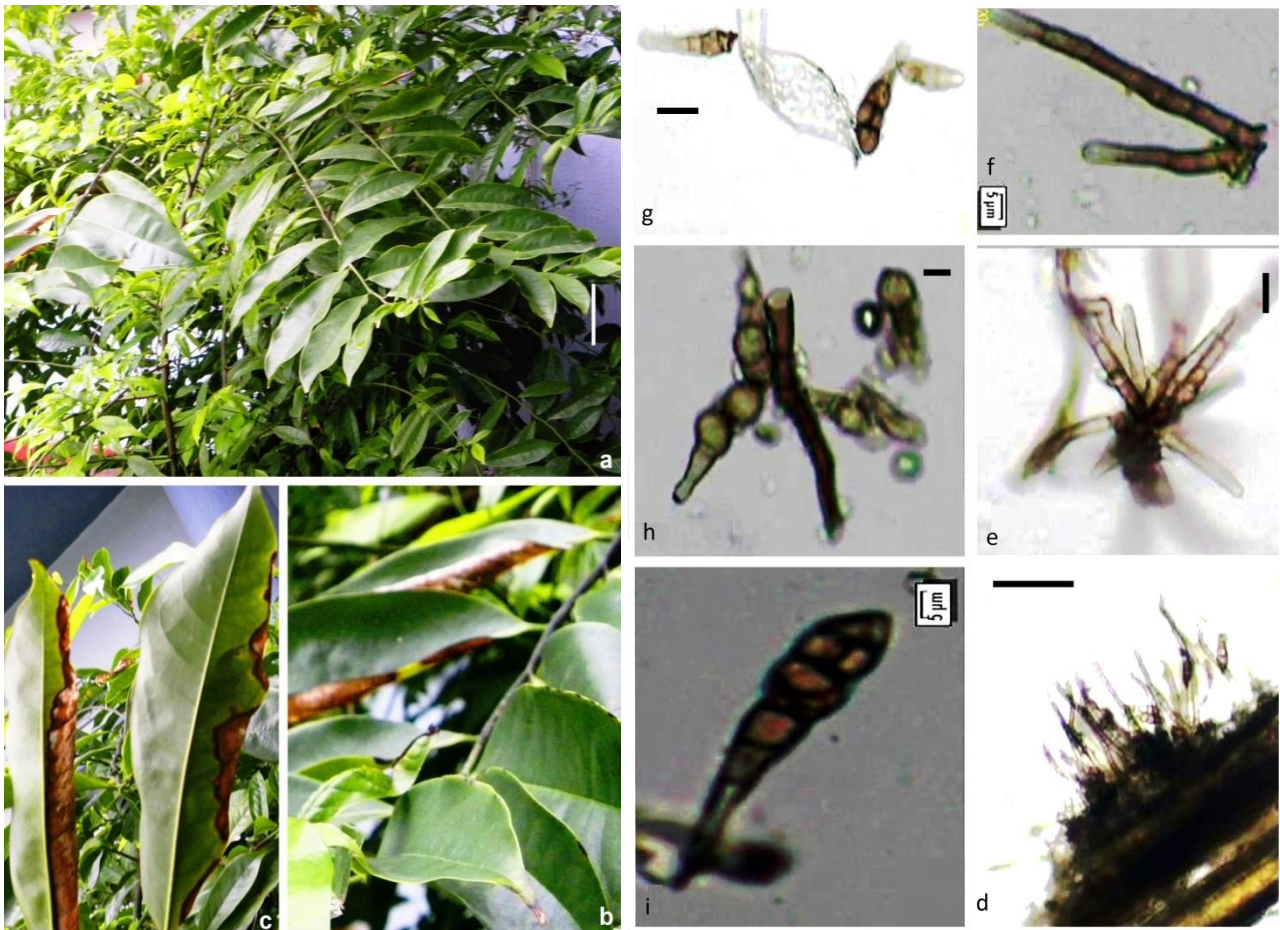


Fig 1 – *Artabotrys hexapetalus*. a, host plant. b, c, symptom on leaves. *Alternaria alternata* microphotographs (d-i) d, host-pathogen interaction. e, f, conidiophores. g, h, i, conidia. Bars = 20 mm (a, b, c), 10 μ m (d, e) and 5 μ m (f, g, h, i)

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References

- Bilgrami KS, Jamaluddin, Rizwi MA. 1979 – Fungi of India I. List and references. Today's and Tomorrow's Printer's and Publisher's, New Delhi, India. pp. 467.
- Bilgrami KS, Jamaluddin, Rizwi MA. 1981 – Fungi of India II. Host index and addenda. Today's and Tomorrow's Printer's and Publisher's, New Delhi, India. pp. 128.
- Bilgrami KS, Jamaluddin, Rizwi MA. 1991 – Fungi of India. List and references. Today's and Tomorrow's Printer's and Publisher's, New Delhi, India. pp. 798.
- Butler EJ, Bisby GR. 1954 – Fungi of India (revised by R.S. Vasudeva). Indian Agricultural Research Institute, New Delhi, India.
- Cannon PF, Kirk PF. 2007 – Fungal families of the world. CAB International Wallingford, UK.
- Ellis MB. 1971 – Dematiaceous hyphomycetes. Commonwealth Mycological Institute, Kew, Surrey, UK.

- Farr DF, Rossman AY. 2015 – Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA. <http://nt.ars-grin.gov/fungaldatabases/> (accessed 30 March 2015).
- Hawksworth DL. 1974 – Mycologist's handbook. Commonwealth Mycological Institute, Kew, Surrey, UK.
- Jamaluddin, Goswami MG, Ojha BM. 2004 – Fungi of India 1989–2001. Scientific Publishers, Jodhpur, Rajasthan, India.
- Johri PK, Divya T, Reeta J. 2009 – Screening of some indigenous medicinal plants for anti-implantation/anti-fertility activity in female albino rats. *Biochemical and Cellular Archives* 9(2), 175–178.
- Khare CP. 2007 – Indian medicinal plants: an illustrated dictionary. New Delhi, India.
- Kirk PF, Cannon PF, Minter DW, Stalpers JA. 2008 – Dictionary of the Fungi. 10th ed., CAB International, Wallingford, UK.
- Li TM, Yu JG 1998 – Study on chemical constituents of leaves from *Artabotrys hexapetalus* L. f. *YaoxueXuebao* 33, 591–596.
- Li TM, Li WK, Yu JG. 1997 – Flavonoids from *Artabotrys hexapetalus*. *Phytochemistry* 45, 831–833.
- Sarbhojy AK, Lal G, Varshney JL. 1975 – Fungi of India (revised) 1967–1971. Navyug Traders Bookseller & Publishers, New Delhi, India.
- Sarbhojy AK, Agarwal DK, Varshney JL. 1986 – Fungi of India (1977–1981). Associated Publishing Company, New Delhi, India.
- Sarbhojy AK, Agarwal DK, Varshney JL. 1996 – Fungi of India (1982–1992). CBS Publishers and Distributors, New Delhi, India.
- Savile DBO. 1962 – Collection and care of botanical specimens. Canadian Department of Agriculture, Publication, Research Branch 1113, 1–124.
- Simmons EG. 2007 – *Alternaria*: an identification manual. The American Phytopathological Society, St. Paul, MN.