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Characterization and Morphology of *Botryosphaeria Ribis* Causing Canker in *Eucalyptus*

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Abstract :

Eucalyptus species are widely cultivated in India for their rapid growth and economic value in reforestation and timber industries. However, their productivity is increasingly threatened by fungal pathogens, among which *Botryosphaeria ribis* has emerged as a significant causal agent of stem canker and gummosis. This paper documents the first confirmed report of Botryosphaeria canker in *Eucalyptus* plantations of Telangana, India. Field surveys and pathogen isolation techniques were employed to assess disease symptoms, collect infected samples, and isolate the causal organism. The characteristic symptoms include sunken, reddish-purple cankers on stems and twigs, gummosis, and necrotic lesions on young shoots and leaf mid-veins. The pathogen was isolated, identified morphologically, and confirmed as *Botryosphaeria ribis* based on Koch's postulates. Detailed morphological features, including pycnidia and conidia structure, are described. The findings underscore the need for heightened disease surveillance, early diagnosis, and management strategies to safeguard *Eucalyptus* plantations from this emerging threat.

Key Words: *Botryosphaeria ribis*, *Eucalyptus tereticornis, E. camaldulensis*, Canker, Gummosis.

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I. INTRODUCTION

Eucalyptus species have become an integral component of commercial forestry in many parts of the world due to their fast growth, adaptability to varied climatic conditions, and high economic value. In India, large-scale plantations of *Eucalyptus* have been established under social forestry, farm forestry, and reforestation programmes to meet the increasing demand for timber, pulpwood, and fuelwood. In states such as Telangana, *Eucalyptus* is widely cultivated because of its short rotation period and reliable productivity even under marginal soil and moisture conditions. Despite these advantages, the long-term performance of *Eucalyptus* plantations is increasingly threatened by several biotic stresses, among which fungal diseases are emerging as a serious constraint.

Fungal pathogens affecting woody hosts often remain unnoticed until visible symptoms appear, by which time considerable damage has already occurred. Among these pathogens, species belonging to the family *Botryosphaeriaceae* are particularly important because of their ability to exist as latent infections and rapidly become pathogenic when the host is subjected to stress (Darge & Woldemariam, 2021). Environmental factors such as drought, high temperature, poor soil fertility, and mechanical injury commonly predispose *Eucalyptus* trees to infection. Once established, these fungi invade the cortical and vascular tissues, resulting in stem cankers, die-back, gummosis, and progressive weakening of the affected trees (Diogo, 2022).

Botryosphaeria ribis is one of the most widely reported species associated with canker and die-back diseases in woody plants. The pathogen typically enters the host through wounds or

natural openings and spreads along the stem tissues, producing sunken lesions, necrosis, and copious gum exudation (Harsh, 2025). In *Eucalyptus*, Botryosphaeria canker has been documented from countries such as Australia and China, where it has been recognized as a significant cause of growth reduction and plantation decline. However, reports on its occurrence in Indian *Eucalyptus* plantations are limited, and detailed studies on symptom expression and pathogen characterization are scarce.

During routine field surveys conducted in different *Eucalyptus*-growing regions of Telangana, canker symptoms accompanied by gummosis were frequently observed on *Eucalyptus tereticornis* and *E. camaldulensis*. The disease was particularly severe in plantations exposed to prolonged dry spells or other stress conditions, indicating a close relationship between host stress and disease development. The characteristic nature of the lesions suggested the involvement of a Botryosphaeria species, prompting a detailed investigation to identify and confirm the causal organism.

The present study was undertaken to document the occurrence of Botryosphaeria canker in *Eucalyptus* plantations of Telangana and to establish the identity of the pathogen responsible for the disease. Field symptoms were carefully recorded, the pathogen was isolated and characterized based on morphological features, and its pathogenicity was confirmed by fulfilling Koch's postulates. This study represents the first confirmed report of *Botryosphaeria ribis* causing stem canker in *Eucalyptus* from this region and highlights the need for regular disease surveillance and timely management practices to protect fast-growing plantation forestry species.

II. MATERIALS AND METHODS

A. Field Survey

A systematic and periodic survey of *Eucalyptus tereticornis* plantations was undertaken across various regions of Telangana. The survey aimed to detect symptoms of canker diseases and assess the severity of infections in the field.

B. Sample Collection

Infected plant parts, including seedlings, leaves, stems, and roots, were collected using sterilized polythene bags to prevent contamination. Observations of disease symptoms were made while the infected materials were still fresh and green.

C. Pathogen Isolation and Culture

The pathogens responsible for the disease were isolated on Potato Dextrose Agar (PDA) slants. Surface sterilization was conducted using ethyl alcohol, following the method suggested by Sileshi et al., (2016). Hyphal tips emerging from the infected portions were carefully picked and transferred to fresh agar slants for further purification.

D. Identification and Authentication

The fungal isolates were identified using standard monographs (Sutton, 1980) and taxonomic keys (Girisham et al., 2017). Final identification and authentication were confirmed by depositing cultures at the Commonwealth Mycological Institute (CMI), Kew, England. The isolate was confirmed to be *Botryosphaeria ribis* Gross and Dug and was assigned IMI No. 359667 by Dr. E. Punithalingam.

E. Pathogenicity Test

Koch's postulates were fulfilled to confirm the pathogenic nature of the isolated fungus.

III. SYMPTOMS OF THE DISEASE

A. External Manifestations

The affected plants of *Eucalyptus tereticornis* and *E. camaldulensis* exhibited conspicuous basal stem cankers, which were often associated with gummosis. These cankers extended to twigs and leaf mid-veins, especially in plantations located at Bhadrachalam (Khammam) and Sirpurkagaznagar (Adilabad), observed during January and February.

B. Canker Formation

On *E. camaldulensis*, lesions appeared as darkened, sunken, circular spots with a reddish-purple hue, affecting various parts of the stem. In

E. tereticornis, prolific callus formation was observed on tender twigs and shoots, accompanied by necrotic lesions on veins and shoots.

C. Gummosis

One of the hallmark symptoms of this disease is gummosis. Gum was seen exuding through lenticels on the bark over an area of approximately 3–5 cm in diameter. These patches appeared moist, brown, and gummy. The necrotic tissue extended deeply into the wood, further compromising the structural integrity of the tree.

IV. MORPHOLOGY OF THE PATHOGEN

The isolated fungus, *Botryosphaeria ribis*, exhibited the following morphological characteristics:

- **Colony Appearance**: Colonies were grayish-black with a central olive tint, consisting of white, cottony mycelium.
- **Hyphae**: Immersed, branched, septate; initially pale brown, transitioning to grayish-brown and finally black.
- **Pycnidia**: Eustromatic, multicellular, up to 1000 µm in diameter, with indistinct ostioles.
- **Conidiogenous Cells**: Holoblastic, determinate, hyaline, smooth, cylindrical, producing single apical conidia.
- **Conidia**: Hyaline, thin-walled, aseptate, fusiform, irregularly guttulate, apex obtuse, base tunicate, measuring 18–26 × 4–4.5 µm.

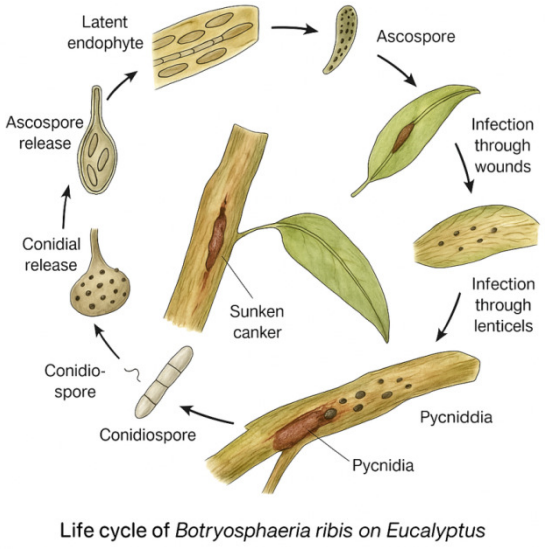

Fig. 1Life cycle of *Botryosphaeria ribis* on *Eucalyptus*

V. GEOGRAPHIC AND HISTORICAL OCCURRENCE

Although *Botryosphaeria* canker has been previously reported from Australia, and china (Li, G.2018; Mohankumar, 2022).), this study marks the occurennce of *Botryosphaeria ribis* on *Eucalyptus* in India, specifically from Telangana. The detection and characterization of the disease in these regions add new insights into the geographical distribution and host range of this pathogen.

VI. CONCLUSION

The emergence of *Botryosphaeria ribis* as a pathogen in *Eucalyptus* plantations of Telangana is of serious concern due to its ability to cause extensive damage through stem canker formation and gummosis, ultimately affecting tree vigor and plantation productivity. Early diagnosis, systematic field surveillance, and accurate pathogen identification are therefore essential for effective disease management and to prevent further spread. The findings of this study enhance our understanding of fungal diseases affecting fast-growing forest species and highlight the role of stress-associated pathogens in plantation forestry. Furthermore, this work provides a scientific baseline for future investigations on host–pathogen interactions, development of resistant or tolerant *Eucalyptus* cultivars, and the formulation of integrated disease management strategies aimed at ensuring the long-term sustainability of *Eucalyptus* plantations.

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REFERENCES

1) Darge, W. A., & Woldemariam, S. S. (2021). Botryosphaeria tree fungal pathogens and their diversity.
2) Diogo, E. L. F. (2022). *Canker and Dieback Diseases of Eucalyptus in Portugal* (Doctoral

dissertation, Universidade NOVA de Lisboa (Portugal)).
3) Girisham, S., Rao, V. K., & Reddy, S. M. (2017). *Taxonomy of mycotoxigenic fungi*. Scientific Publishers.
4) Harsh, N. S. K. (2025). Diseases of Tree Species. In Textbook of Forest Science (pp. 751-774). Singapore: Springer Nature Singapore.
5) Li, G. Q., Liu, F. F., Li, J. Q., Liu, Q. L., & Chen, S. F. (2018). Botryosphaeriaceae from *Eucalyptus* plantations and adjacent plants in China. *Persoonia-Molecular Phylogeny and Evolution of Fungi*, *40*(1), 63-95.
6) Mohankumar, V., Dann, E. K., & Akinsanmi, O. A. (2022). Diversity and pathogenicity of Botryosphaeriaceae associated with macadamia branch dieback in Australia. *Plant Disease*, *106*(10), 2576-2582.
7) Negi, N., Pandey, A., Meena, R. K., Bhandari, M. S., & Pandey, S. (2024). Morphology, phylogeny and pathogenicity of Botryosphaeria dothidea causing leaf blight of *Eucalyptus* in India. *Crop Protection*, *178*, 106585.
8) Sileshi, F., Galano, T., & Biri, B. (2016). Plant Disease Diagnosis.

