

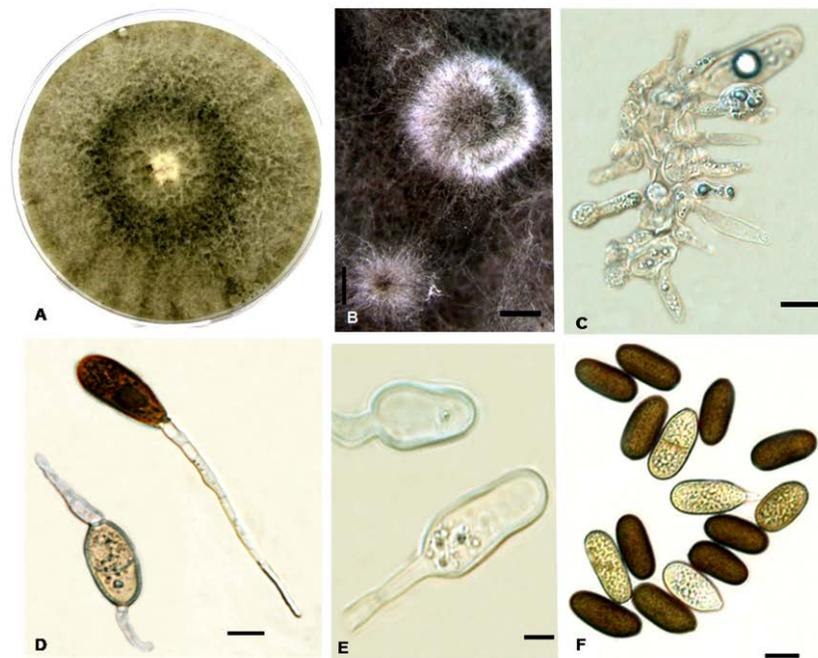
# **BOTRYOSPHAERIACEAE ASSOCIATED WITH *ACACIA KARROO* IN SOUTH AFRICA**

*Prepared by Fahimeh Jami*

Fungal endophytes form an integral part of microbial communities that are commonly associated with plants. Fungi in the order Botryosphaeriales represent one of the best examples of endophytes. This order contains species that have a cosmopolitan distribution and wide host range, including gymnosperms, monocotyledons and dicotyledons. They also occupy a wide range of niches and can be primary or opportunistic pathogens, endophytes or saprobes. In agricultural and forestry plant communities that have been examined, woody plants often displayed high levels of colonization by endophytic fungi in the family Botryosphaeriaceae. Some species within the Botryosphaeriaceae are known as serious latent pathogens on a wide range of agricultural crops that are of economical importance including fruit trees such as willow, almond, walnut, cork oak, apples, pistachio, peaches, pears, avocado, mango, macadamia, Olive and pome fruits.

Fungi in the Botryosphaeriaceae infect their hosts through natural openings and wounds, although wounds were previously thought to be the primary mode of entry into the host. Species within this family reproduce sexually during their life cycle through the production of ascospores (sexual spores) and asexually through conidia (asexual spores). The conidia are dispersed mostly by wind or through rain splash, and are therefore considered the primary source of inoculum during host infection.

Fungi in the Botryosphaeriales usually do not cause disease symptoms on their hosts unless the hosts are exposed to environmental stress. Typical symptoms include canker and die-back, followed by kino exudation, blackish discoloration of the heartwood and pith, fruit rot, leaf blight, premature leaf drop, gummosis and, in severe cases, tree death. Cankers develop on the trunk and larger branches of trees. The bark in cankered areas becomes dry and cracked and the inner bark becomes reddish or purplish. During a single growing season one or more large branches may die and after another year or two the cankers become so abundant as to completely girdle the trunk. Within three to four years after initial infection, the entire tree will be killed.

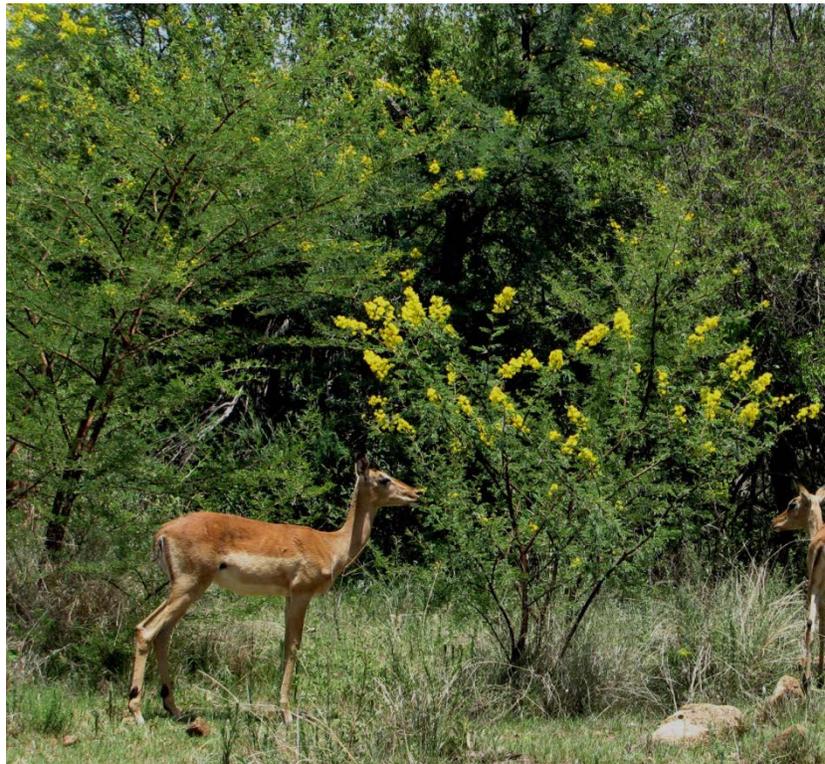


**A.** Culture morphology on MEA plate, **B.** Pycnidia (fruiting body), **C.** Conidiogenous cells **D.** Germinating conidia  
**E.** Young conidia with attached conidiogenous cells **F.** Conidia

The importance of species within Botryosphaeriaceae has led to this fungal family being one of the best-studied groups in South Africa. Species belonging to this family have been identified during earlier studies from symptomatic and asymptomatic tissues of at least 36 indigenous and exotic tree species from different parts of South Africa. Among the indigenous trees, *Acacia karroo* (Sweet thorn) was identified being a host to some species in the Botryosphaeriaceae.



Die-back on *Acacia karroo* in Pretoria, 2010



*Acacia karroo* (Sweet thorn)

During a recent study we considered the taxonomy and biogeography of the Botryosphaeriaceae associated with *Acacia karroo*. Samples were collected from healthy trees from 23 sites across the distribution of this tree in South Africa. Intense systematic and hierarchical sampling in the Tshwane area was also done over a number of years. Isolates collected during the study were grouped based on PCR-RFLPs of the ITS region as well as their growth morphology in culture. Isolates representing the identified groups were subsequently used in comparisons based on the DNA sequences from their ITS and TEF-1 $\alpha$  gene regions. In total, 16 Botryosphaeriaceae species were identified across South Africa, of which five species were described as new taxa for this family. The results illustrated a rich diversity of Botryosphaeriaceae that can exist on a native host, even in the absence of obvious disease. Results from our biogeographic analysis showed clear pattern of geographic isolation, with some species occurring only in some parts of the country. This study provides information to enhance our current understanding regarding the patterns and processes that shape the diversity of Botryosphaeriaceae across native landscapes.