



Fig 1. Flagging and crown dieback caused by *Zythiostroma* sp. Fig 2. A typical canker caused by *Zythiostroma* sp. on *B. baxteri*. Fig 3. Colony morphology of *Zythiostroma* sp. Fig 4. A close up of the pycnidia on the stem of *B. baxteri*.

Common Name: *Zythiostroma* sp.

Disease: Aerial Canker in Banksia

Classification: K: Fungi; P: Ascomycota; C: Sordariomycetes; SC: Hypocreomycetidae; O: Hypocreales; F: Nectriaceae.

Cankers are localized wounds in the stem of woody plants and other plants that are often hidden beneath the surface of the bark. A large range of different pathogens can cause cankers, but arguably the most common causal agents are the Ascomycetous fungi. In Western Australia (WA), these canker fungi include *Botryosphaeria*, *Cryptodiaporthe*, *Cytospora*, *Endothiella*, *Phoma*, *Quambalaria*, *Seiridium* and *Zythiostroma*.

The Pathogen

Zythiostroma is a genus of canker fungi in the family Nectriaceae. *Zythiostroma* sp. has been commonly isolated from diseased Banksias across the south-west of the state. Although this species is still to be formally described it is reasonably widespread and has been demonstrated to have a strong pathogenic ability. The *Zythiostroma* sp. has been identified to be a major threat to a number of rare Banksia species in WA, including the endangered *Banksia brownii*.

The pathogen is transmitted to new hosts through the movement of conidia in rainsplash and movement of infected material. Only the asexual stage has been observed in WA and the role of the sexual stage on the epidemiology of the pathogen is unclear.

Host Range

Zythiostroma sp. has mostly been recorded on host plants from Proteaceae in the native plant communities from WA, including *B. baxteri*, *B. brownii*, *B. attenuata*, *B. coccinea*, *B. grandis* and *B. verticillata*.

Impact

Typical symptoms of an infected host plant include crown dieback, flagging and cracking of bark that highlights the underlying canker (Figure 1, 2). In some cases the pathogen may only kill one branch on a host plant, but in other cases it can cause almost complete crown dieback of the infected plant or collapse of the Banksia entire community.

Shearer *et al.* (1995) demonstrated that *Zythiostroma* sp. was more pathogenic than *Botryosphaeria ribis* and *Cryptodiaporthe melanocraspeda* in underbark inoculations in *Banksia baxteri* and *B. coccinea*. Due to the lower frequency of recovery of the pathogen in *B. coccinea* than these other two canker fungi, it was hypothesised that *Zythiostroma* sp. may have more specific environmental conditions for infection to occur. It is likely that increasing climatic extremes may increase occurrence and impact of the pathogen.

Distribution

Zythiostroma sp. is found in discrete disease centres across the south-west of WA. The pathogen has been recorded in the Jarrah forest, Banksia woodlands, Northern Sandplains and the heath communities in the south coast.

Key Features

Mycelium in culture is immersed, septate, pale brown to hyaline (Figure 3, 4). Pycnidia subcortical finally superficial erupting through bark, black, ostiolate, multiloculate and involuted. Conidiogenous cells phialidic, enteroblastic, hyaline, channel and collarette minute. Conidia acropleurogenous, hyaline, aseptate, straight or slightly allantoid, 4 by 1µ, orange yellow on mass.

Given the clear threat of *Zythiostroma* sp. and other canker fungi to many of WA's rare plants, horticultural and forestry species it is imperative that further research is conducted to adequately assess the threat of this group of important plant pathogens in WA.

Further Reading: Shearer *et al.* (1995). Plant Disease 79:637-641.

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