

**PHAEOPHLEOSPORA EPICOCOIDES LEAF DISEASE OF
EUCALYPTUS IN CHINA**

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While examining stands of *Eucalyptus grandis* and *E. grandis* × *E. urophylla* hybrids being grown in plantations for wood production in Sichuan Province, China, we observed that the leaves were often rather chlorotic. When examined closely it was observed that on the chlorotic leaves there were abundant small aggregations of black-coloured spores on the abaxial surface. Selected specimens were pressed and returned to Australia for further study.

Microscopic examination showed the spore masses were of holoblastic, rough-walled conidia, extruded from immersed, subepidermal or substomatal, unilocular pycnidia, with ornamented, dark pigmented, percurrent conidiogenous cells but no conidiophores. This combination of characters indicated a species of *Phaeophleospora* Rangel (Crous *et al.* 1997). The *Phaeophleospora* conidia present on the eucalypt leaves collected in China are 2–5 euseptate, 33–58 × 3.2–5.2 µm, narrowly obclavate, with apex obtuse, straight or curved, brown, thick-walled, verruculose. The fungus was identified as *P. epicoccoides*, and is a new record for China.

Five species of *Phaeophleospora* are known to occur on eucalypts:

- P. delegatensis* (R.F. Park & Keane) Crous;
- P. destructans* (M.J. Wingfield & Crous) Crous, F.A. Ferreira & B. Sutton;
- P. epicoccoides* (Cooke & Massee) Crous, F.A. Ferreira & B. Sutton;
- P. eucalypti* (Cooke & Massee) Crous, F.A. Ferreira & B. Sutton; and
- P. lilianiae* (J. Walker, B. Sutton & I. Pascoe) Crous, F.A. Ferreira & B. Sutton.

Phaeophleospora epicoccoides and *P. eucalypti* have been recorded from many parts of the world, including Australia. They have broad host ranges in

both *Corymbia* and *Eucalyptus* (Sankaran *et al.* 1995, Walker *et al.* 1992). By contrast, *P. delegatensis* is known only from *E. delegatensis* and *E. obliqua* (Crous 1998), while *P. lilianiae* is known only from *Corymbia exima* (Walker *et al.* 1992). These latter two species of *Phaeophleospora* are known only from Australia. The most damaging species from an economic perspective is the tropical *P. destructans* which is known from *E. camaldulensis*, *E. grandis*, *E. urophylla* and hybrids of those species in East Timor, Indonesia, Thailand and Vietnam (Old *et al.* 2003, Wingfield *et al.* 1996). The teleomorph, where known, is a species of *Mycosphaerella* Johanson (Crous & Wingfield 1997).

Collections examined: China, Sichuan, Jia Jiang, *Eucalyptus grandis*, five year old trees, J.A. Simpson (C059), 10.vii.2004 DAR 76880. Jia Jiang, *E. grandis* × *E. urophylla*, two years old, J.A. Simpson (C061), 10.vii.2004 DAR 76881.

Most species of *Mycosphaerella*, and related anamorphs, that infect eucalypt leaves cause so-called mycosphaerella leaf blotch disease (MLB) (Crous & Wingfield 1997) with necrosis of infected tissues prior to spore production i.e. these fungi are necrotrophs (Thrower 1966). Species of *Phaeophleospora* are unusual in that the species are facultative biotrophs, spreading intercellularly through the leaf mesophyll, but often not causing leaf necrosis prior to sporulation. Infection usually results in premature defoliation, but spore production can occur on infected leaves for a long period of time. Hood *et al.* (2002) made similar observations with *P. eucalypti* on *E. nitens* in New Zealand. There is massive spore production from chlorotic green leaves. Conidia are dispersed by water splash and by wind.

Often considered of minor importance, *P. epicoccoides*

has been associated with serious defoliation in plantations in South Africa (Knipscheer *et al.* 1990) and New South Wales (Simpson unpublished), and in nurseries in Australia (Walker 1962). Management of the pathogen is difficult. Old *et al.* (2003) suggested the only viable management strategy for plantations is to select and use resistant or tolerant germplasm. This approach has been successful in Indonesia (Old *et al.* 2003). In Sichuan, the eucalypt trees are being grown for fibreboard production or veneer, on a six or seven year rotation, from seed gathered locally from superior trees in existing plantations. In this situation of intensively managed, very short rotation crops, management by tree selection and tree breeding should be achievable. More than 130 species of eucalyptus have been introduced to Sichuan in the past 100 years (Li & Hu 2003). There has been no comprehensive study of the pathogens present in these plantings that are the most northerly in China. The phenology of eucalypts is complex with repeated new flushes of foliage, and leaves of different morphology depending upon the age of the tree (Hood *et al.* 2004). The impact of *P. epicoccoides* on growth of eucalypt plantations in Sichuan is not known. We would expect that fungicides would provide cost effective control of the pathogen in eucalypt propagation nurseries but not in commercial plantations.

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