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## **DISEASE NOTES OF NEW RECORDS**

### **First record of *Mycosphaerella heimii* in Australia**

G. White<sup>A</sup>, T.I.Burgess<sup>A,B</sup>, P.A.Barber<sup>A</sup>, and G.E.St.J. Hardy<sup>A</sup>

<sup>A</sup>School of Biological Sciences and Biotechnology Murdoch University, Murdoch, WA 6150, Australia.

<sup>B</sup>Corresponding author. Email: tburgess@mrdoch.edu.au

### **Abstract**

*Mycosphaerella heimii* was found associated with foliage of *Eucalyptus dunnii* in a plantation in south-west Queensland in May 2004. This is the first record of *Mycosphaerella heimii* in Australia.

The eucalypt plantation industry is rapidly expanding in Australia. The National Forest Inventory (2004) reports that 675 962 ha of hardwood plantations (predominantly *Eucalyptus* species) are now established in Australia. The industry in Queensland is relatively new, with 30 000 ha of commercial eucalypt plantations established within the past 5 years (National Forestry Inventory 2004).

*Mycosphaerella* is one of many genera of pathogenic fungi associated with eucalypts capable of causing necrotic blighting of foliage and stems, resulting in a loss of photosynthetic area and potential reduction in yields (Carnegie *et al.* 1998; Maxwell *et al.* 2003). The subtropical climate of southern Queensland appears to favour the development of foliar pathogens such as *Mycosphaerella* species. Recently, 12 *Mycosphaerella* spp. were described on a variety of host species other than *Eucalyptus* in Queensland (Sivanesan and Shivas 2002). It is likely that as research continues in this part of Australia, many first records and new *Mycosphaerella* species associated with eucalypts will be found (Jackson *et al.* 2005).

Regular pest and disease surveys of *Eucalyptus dunnii* plantations in south-eastern Queensland (north of Bundaberg) commenced in late summer in 2003. In May 2004, necrotic lesions were observed on juvenile foliage of 1 ha of 18-month trees at one plantation. On average, 20-30% of leaves had lesions, although the worst affected trees had lesions on as much as 70% of their foliage. Severity also varied from one to two lesions per leaf to complete coverage. Lesions were typically 5-10mm in diameter, irregular, frequently with a defined red-brown margin, and present on both surfaces. Lesions and pseudothecia from infected foliage were examined microscopically using squash mounts. Pseudothecia were dark brown and suppressed. Ascospores were ejected onto 2% malt-extract agar to examine germination patterns, as described by Crous (1998). Two single spore isolates were grown on 2% malt extract agar at 25°C for three weeks. These isolates were used to extract DNA, which was sequenced and used for molecular identification.

The entire ITS1-5.8S-ITS2 region of the rDNA of one of the isolates was amplified by PCR using ITS1F (Gardes and Bruns 1993) and ITS4 Primers (White *et al.* 1990) and sequenced. It was identical to *M. heimii* (AF452517) in GenBank (<http://www.ncbi.nlm.nih.gov/>). The anamorpha, *Pseudocercospora heimii* Crous was not observed on lesions, but conidia were produced in culture after three weeks. Herbarium specimens and cultures are maintained at Murdoch University. ITS sequence data for culture MUCC 386 from herbarium specimen MURU 405 has been deposited in GenBank (accession number DQ124702).

Fifty ascospores were measured they had no constriction at the mid septum and dimensions of 5.6-8.1 x 2.0-3.2 $\mu$ m (average 6.6 x 2.4  $\mu$ m). These were shorter than those described for *M. heimii* by Crous (1998), which were (8-)9-11(-12) $\mu$ m x 2-2.5(-3) $\mu$ m. Fifty measured asci had dimensions of 27.4-38.6 x 4.0-9.7 $\mu$ m (average 31.4 x 6.6 $\mu$ m). The asci described by Crous (1998) were of similar dimension (25-40 x 6-9 $\mu$ m).

*Mycosphaerella heimii* was first described in Madagascar on foliage of a *Eucalyptus* sp. by Bouriquet in 1946 and then in Indonesia on *Eucalyptus urophylla* (Crous 1998). This species has not previously been recorded in Australia. In contrast to the limited spotting on the type material from Madagascar, the Indonesian material showed extensive leaf spotting and was considered to be an important leaf pathogen (Crous 1998). In Queensland, *M. heimii* is potentially an important pathogen of *E. dunnii* and possibly other plantation eucalypts. However, further work is required to establish pathogenicity and host range of *M. heimii* before it is possible to establish how important it will be as a pathogen. The lesions and pseudothecia examined in the present study were consistent with the description of *M. heimii* by Crous (1998), although red margins around the lesions are not as obvious. This feature might well vary between host species.

Crous (1998) speculated that *M. heimii* was introduced to Madagascar on *Eucalyptus* material from Indonesia. The plantation estate in Queensland has only recently been established. We are not aware of any exchange of germplasm occurring between Queensland and Madagascar or Indonesia. *M. heimii* might be native to Indonesia as a pathogen of native eucalypts, but it is also possible that *M. heimii* is endemic to southern Queensland in native eucalypt forests. Further study of diseases in southern Queensland is underway and this might reveal more information regarding the potential threat of *M. heimii* to eucalypt plantations in Australia.

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