



Soil-mediated effects of *Eucalyptus viminalis* dieback on plant performance and associations with mycorrhizal assemblages.

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Various factors may be associated with *Eucalyptus* dieback in Australia. To investigate *Eucalyptus viminalis* woodlands' soil-mediated effects on plant performance, we conducted a greenhouse experiment comparing plants grown in soil from healthy and dieback stands. The soil was either live, sterilised or a mixture consisting of sterilised soil with a 7% live soil addition. After six months, various plant performance parameters were measured. Roots were harvested, stained and microscopically examined to determine the percentage of root length colonised by arbuscular mycorrhizae, ectomycorrhizae and dark septate endophytes. Plant performance grown in healthy soil was significantly ($P < 0.001$) better than those grown in dieback soil ($P < 0.001$). Treatments (i.e live, sterilised and mixed) also showed a statistically significant ($P < 0.001$) effect with seedlings growing taller in healthy soil than in dieback soil. Root analyses showed that seedlings in healthy soil predominantly associated with ectomycorrhizae, while mostly arbuscular mycorrhizae were found in roots grown in dieback soil. Plants generally performed better in sterile soil than in live soil, suggesting negative biotic factors in live soil. This is confirmed by reduced growth in mixed soil compared to sterilised soil. Preliminary analyses suggest that mycorrhizal type has little influence on seedling performance contrary to expectations.

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