

## The effect of summer heat and stubble load on endophyte viability in annual ryegrass

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**Summary** Annual ryegrass (*Lolium rigidum* Gaudin) is a significant and persistent weed of southern Australian cropping systems, costing farmers in excess of \$300 million and infesting over 12 million hectares. Its propensity to evolve herbicide resistance to nearly all chemicals applied to control it has made it a formidable weed to manage. Annual ryegrass has also co-evolved with the fungal endophyte, *Epichloë occultans*. *Epichloë* species of cool season grasses such as perennial ryegrass and tall fescue provide their hosts with relief from biotic and abiotic stresses through known and unknown mechanisms respectively. The contribution of *E. occultans* to the success of annual ryegrass as a weed still remains to be elucidated. This study examines the effect of summer heat and stubble load on the viability of the

*E. occultans* in annual ryegrass seed. Plots were set up in a rain shelter to stop premature germination of samples due to summer rain. Seed was placed in mesh bags and where applicable secured to the ground using plastic stakes to exclude invertebrate and vertebrate predation. Treatments included seed that was kept at ambient temperatures in laboratory, on soil surface, buried at 5 cm soil depth and also placed under simulated stubble at 3 and 6 t ha<sup>-1</sup>. Seed was sampled over the February-April period three times to examine endophyte viability. We found that: endophyte viability declined in all samples; endophyte viability continued to decline with time; and field samples lost endophyte viability faster than those in the laboratory treatment. The implications for the endophyte in annual ryegrass under varying cropping regimes are discussed.