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Vermicompost leachate improves seedling emergence and vigour of aged seeds of commercially grown Eucalyptus species

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Eucalyptus is the major commercial forestry tree species in South Africa. Application of organic fertilizers for raising eucalypt seedlings has not been much studied. Prolong use of chemical fertilizers in the nurseries and at planting sites can be detrimental to the soils and surrounding environment. Vermicompost leachate (VCL) is a liquid generated by earthworms and microorganisms during the conversion of organic matter into vermicompost. Four-year-old seeds of *Eucalyptus dunnii*, *E. nitens* and *E. smithii* were subjected to VCL at different (1:5, 1:10 and 1:20 v/v) concentrations. In comparison to the control, seedling emergence percentage of all three species improved significantly ($p < 0.05$), more than two to three times, when treated with VCL. Treated seedlings showed better growth performance than the untreated seedlings at both first and second harvests (75 and 150 days after sowing, respectively). However, some of the growth parameters were not significantly different from the control. *Eucalyptus dunnii* achieved the highest seedling vigour index (SVI) at the lowest VCL concentration of 1:5. In contrast, the SVI of *E. nitens* was maximum at the highest concentration of VCL (1:20). The best SVI of *E. smithii* was obtained at a VCL concentration of 1:10. These results suggest that the influence of VCL on SVI of eucalypt species tested was concentration-dependent. The absolute seedling vigour rate per day was also improved with all the tested concentrations of VCL with some exceptions for *E. dunnii* seedlings. The order of response to VCL by the species can be summarized as *E. smithii* > *E. nitens* > *E. dunnii*. The results of this study suggest that VCL can be supplemented with chemical fertilizers. The liquid nature of VCL should be a convenient application both in nurseries and field conditions. However, trials under field conditions are required.