Reproduction in selected New Zealand native ferns and their suitability for revegetation

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Matthew Denton-Giles

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ABSTRACT

The potential to use New Zealand native ferns for revegetation was assessed in laboratory, nursery and field experiments. Laboratory experiments indicated that the three native fern species, *Blechnum novae-zelandiae*, *Cyathea medullaris* and *Dicksonia squarossa*, had different maximum levels of spore germination. These differences also varied in response to seasonal changes in the environment. The effect of three soil conditioners on the germination of the same three species was minimal. Gametophytes appeared to be tolerant of low levels of maceration, as they were able to continue to grow and develop normally. Additional laboratory experiments indicated that *B. novae-zelandiae* employs a mixed mating system, which utilizes an "antheridiogen" signal.

The development of fern spores, laboratory propagated gametophytes and segmented rhizomes, was assessed in the nursery. Each experiment was applied with a hydroseeding mix of paper fibre, tackifier, fertilizer and water. Spore of *B. novae-zelandiae*, *C. medullaris* and *D. squarossa* failed to produce any long-lived gametophytes. The survival of laboratory propagated gametophytes of *B. novae-zelandiae*, *B. discolor* and *B. colensoi* was low. However, a large proportion of surviving *B. novae-zelandiae* gametophytes produced sporophytes. *B. novae-zelandiae* rhizome segments produced healthy young ferns within 3 months of application.

Field experiments were conducted on a sandstone/loess bank, 5 km east of Palmerston North. Aspects of the substrate were analysed including, pH, N, P and organic matter. The results indicated that the bank had a high soil pH, was deficient in several macronutrients and had no organic matter. Hydroseeding was applied using spore of the species *B. novae-zelandiae*, *C. medullaris* and *D. squarossa*. Hydroseeded spore failed to produce any visible gametophytes. Rhizome experiments using *B. novae-zelandiae* and *Microsorum pustulatum* were also established. Low water availability resulted in poor rhizome establishment.

The results suggest that there is great potential for utilizing native ferns in revegetation. *Blechnum novae-zelandiae* is the best species for revegetation in accordance to the

results. Propagation via rhizome segmentation and gametophyte hydroseeding appear to be the most successful methods for establishing native ferns.

This TIF project was carried out in conjunction with Rural Supply Technologies, Manaaki Whenua Landcare Research, Massey University and FoRST New Zealand.

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"Nature will forever endeavour".

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