

Practical Propagation Methods for Production of Prothalli and Sporophytes in *Deparia pycnosora* (Christ) M. Kato

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ABSTRACT

Deparia pycnosora (Christ) M. Kato is a fern used as ornamental plant. In addition, it is called “Teol-go-sa-ri” in Korean name. The aim of this study was to develop a practical propagation method of *D. pycnosora* using tissue culture technique. Prothallus obtained from spore germination was the used as experiment materials. The prothalli (300 mg) used in all experiments were sub-cultured for 8-week intervals. The most suitable media for prothallus propagation were identified by culturing 300 mg of prothalli in 1/4×, 1/2×, 1×, 2× MS medium and in Knop medium for 8 weeks. Also, the prothalli were cultured by chopping with a scalpel. In addition, sucrose, activated charcoal, and total nitrogen source were added in different concentrations based on the culture medium selected. Cultures were maintained at a temperature of $25 \pm 1^\circ \text{C}$, light intensity of $30 \pm 1.0 \mu \text{mol-m}^{-2} \cdot \text{s}^{-1}$, and a photoperiod of 16/8 h (light/dark) in in vitro. The results showed that optimum was achieved prothallus fresh weight and development in 1× MS medium. When other components were added to the basic 1× MS medium, prothallus propagation was maximized in 1× MS medium supplemented with 2% sucrose, 0.2% activated charcoal, and 60 mM total nitrogen. To select a suitable soil mixture for sporophyte formation, 1.0 g of prothallus was blended with distilled water, spread on five combinations of different soil substrates (decomposed granite, horticultural substrates, peat moss, and perlite), and cultivated for 12 weeks. The sporophyte cultures were maintained at a temperature of $25 \pm 1^\circ \text{C}$, light intensity of $43 \pm 2.0 \mu \text{mol-m}^{-2} \cdot \text{s}^{-1}$, humidity of $84 \pm 1.4\%$, and a photoperiod of 16/8 h (light/dark). As a results, horticultural substrate alone, 2:1 (v:v) mixtures of horticultural substrate and perlite, and 2:1 mixtures of horticultural substrate and decomposed granite induced 208.0, 201.3 and 248.8 sporophytes per pot, respectively. Therefore, this result could provide a practical mass propagation method of *D. pycnosora*

Keywords: fern mass propagation, gametophyte, horticultural substrate, prothallus, sporophyte

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