

***IN VITRO* Nutritional Study of Macronutrient, Potassium, Phosphorus and Sucrose on the Growth of *Paphiopedilum barbatum* Orchid**

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ABSTRACT

Optimum nutrient requirements for the endangered orchid species, *Paphiopedilum barbatum*, to induce optimum seedling growth have not been previously investigated. Therefore, it is important to evaluate the growth of seedlings in varying concentrations of macronutrient, P and K and a carbon source, sucrose. The aim of this study was to test these four nutrients to find which concentrations for each will yield the optimum growth of *P. barbatum*. The growth of *P. barbatum* seedlings were evaluated by altering the concentration of the nutrients of a defined medium. The level of the four nutrients was adjusted to 0.25×, 0.5×, 1×, 2× and 4× and *in vitro* germinated seedlings of *P. barbatum* were subcultured onto these media with macronutrient and K being tested at 0.5×, 1×, 2× and 4× nutrient levels and sucrose and P being tested at 0.25×, 0.5×, 1×, 2× and 4× nutrient levels. The seedlings were allowed to grow for 90 days with a subculturing to the same treatment media at day 45. At day 90, the seedlings were dissected to shoots and roots. Plant fresh weight and dry weight were obtained. Root to shoot ratio and water content was also calculated to understand the development and hydration levels of the seedlings. These parameters were analysed statistically to detect significant difference between treatment means. Maximum growth of seedlings was induced by 2× or 28.4 mM macronutrient, 0.5× or 2.95 mM phosphorus, 2× or 18.6 mM potassium and 2× or 50 g/L sucrose. However, the concentration (2×) for sucrose is not regarded as the optimum concentration but as the preferred concentration producing maximum yield. The findings from this study are vital in aiding *in vitro* propagation efforts in preserving this beautiful and rare orchid species of high horticultural value and could also be of help with other species of orchids such as *Phalaenopsis*.