



ENHANCED MICROPROPAGATION OF *DENDROBIUM ANOSMUM* 'DI LINH' VIA USING AN ORCHID NET HOUSE: A NOVEL METHOD FOR ORCHID INDUSTRIAL PRODUCTION

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Abstract

The germination *in vitro* is a successful technique for non-endospermic seeds. In this study, a novel method was developed for the mass production of *Dendrobium anosmum* 'Di Linh' plantlets. Using MS medium supplemented with 0.2 mg l⁻¹ BA, 99% of the seeds germinated and formed protocorm in a net house with no air conditioning or environmental control, or other technological aids. Shoot induction was achieved in the MS medium supplemented with 0.5 or 0.75 mg l⁻¹ BA, whereas their multiplication required the same medium with 0.75 mg l⁻¹ BA and 0.1 mg l⁻¹ NAA. The rooting of *in vitro*-established shoots was successfully achieved in the plant growth regulator-free MS medium supplemented with 1.0 g l⁻¹ active charcoal. Mature plantlets cultured from the net house were successfully acclimatized into *ex vitro* condition with, on average, a 98% survival ratio, 2.0 new shoots, and 8.3 cm of shoot length which were significantly better than those developed in the controlled room for 150 days after transplanting. The achievement of this study indicate that the net house seems to be a novel and economical method for large-scale production of *D. anosmum* 'Di Linh', not only improving plantlet quality but also saving energy and reducing product costs.

Key words: acclimatization, large-scale production, plantlets, propagation, seed germination

INTRODUCTION

There is a high demand for *D. anosmum* Lindl. in ornamental and cut flowers industries due to its variety of shapes, vibrant scent, and colours (Teixeira da Silva et al. 2015a, 2017a). Consequently, natural forests in Vietnam are currently being over-exploited for the collection of *D. anosmum* (Teixeira da Silva and Ng 2017, Maharjan et al. 2019, 2020). In addition, the low rate of seed germination in nature, global climate change, and limited natural resources are further threatening its habitat, which may result in the extinction of this particular species in the future (Teixeira da Silva and Ng 2017a, Maharjan et al. 2020). Recently, tissue culture using artificial media, supplemented with different types and concentrations of plant growth regulators (PGRs), has

been intensively used for the propagation of orchid plants (Li et al. 2013, Sarmah et al. 2017, Maharjan et al. 2019, 2020). This method not only produces a substantial number of genetically similar, high-quality plantlets by culturing explants under optimal conditions but also provides a powerful tool for germination of non-endospermic orchid seeds (Pant and Thapa 2012, Paul et al. 2012, Hossain et al. 2013, Mala et al. 2017, Lin et al. 2020, Le et al. 2022).

Although *in vitro* micropropagation has been successfully applied for culturing *Dendrobium* so far, the acclimatization of plantlets to *ex vitro* conditions has become a critical concern in recent times. Teixeira da Silva et al. (2017a) noted that only 40% of the mainstream literature on *Dendrobium in vitro* propa-