

ABSTRACT

Diallel Crossing of Two *Phalaenopsis* Parent Plants, *In Vitro* Seed Germination, Seedling Growth and Plantlet Acclimatization

By

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Phalaenopsis is a popular member of Orchidaceae that has a high economic value due to its uniqueness of the shape, size, and color of its flowers. Currently, the prospect of *Phalaenopsis* market as well as interest of plant breeders to create new hybrids are increasing. Therefore, research in plant breeding and plant propagation is important.

This study consisted of four experiments that aimed to investigate (1) diallel crossing of two *Phalaenopsis* parent plants, (2) the effects of two basic media and activated charcoal (AC) on *in vitro* seed germination, (3) the effects of two basic media on *in vitro* seedling growth, and (4) the effects of benzyladenine (BA) or 1 gibberellic acid (GA) application on plantlet growth during acclimatization.

The experiments were conducted at laboratory of plant tissue culture and green house at Faculty of Agriculture, The University of Lampung since March 2009 until January 2010. In experiment I, diallel crossing of two *Phalaenopsis* parent plant were done, resulting in four mating (crossing and selfing of the two parents). Each mating was repeated three times. In experiment II, *Phalaenopsis* seeds were sown on two basic media (MS or Growmore) with or without 2g/l activated charcoal. In experiment III, the same combinations of basic media and AC were used to grow two month-old *Phalaenopsis* protocorms resulted from experiment II. In experiment IV, plantlets were acclimatized in a shaded greenhouse and treated with 20 mg/ml BA or 20 mg/l GA or without plant growth regulator as a control treatment. Experiment II and III were conducted in completely randomized design, whereas experiment IV in completely randomized block design. All combinations of treatments were repeated three times. Data from all experiments were subjected to analysis of variance and if there was any significant F result (s), the means were separated using least significant different

(LSD) at 0,05.

Results of experiment I showed that all of the four mating between P1 and P2 produced seed pods, which implied that the two *Phalaenopsis* parents were cross- and self-compatible.

Results of experiment II, showed that Growmore basic medium was better than MS medium, and the basic medium without AC was better than with addition of AC for *in vitro* germination of *Phalaenopsis* seeds.

Results of experiment III, showed that the two basic media tested did not influence seedling growth. However, addition of 2g/l AC in the medium resulted in better seedling growth which were showed by increasing number of leaves and plant fresh weight.

Results of experiment IV, showed that application of 20 mg/l BA significantly increased plantlet growth during acclimatization, which was showed by the increase of leaf width, plant fresh weight and number of roots. However, application of 20 mg/l GA generally did not influence plantlet growth. This treatment only increased number of roots but did not affect other growth variables.