

Application of Growmore Fertilizer to the Growth of *Dendrobium* sp. at the Acclimatization Stage

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Abstract. Orchid *Dendrobium* sp. is one type of ornamental plant with high potential to be developed in Indonesia both as a cut flower and as a potted ornamental plant. The demand for orchids that continues to increase yearly has not been followed by adequate production. In general, the orchid *Dendrobium* sp. propagated through tissue culture and the final stage of tissue culture is acclimatization. Acclimatization is an essential stage in orchid cultivation, so it requires proper nutrition and maintenance so that it can support the growth and development of orchid seedlings. One important aspect of acclimatization is fertilization. To be fertile and fast flowering, orchid plants need to be fertilized with complete macro and micronutrients. Growmore is a complete foliar fertilizer (N 20%, P₂O₅ 20%, and K₂O 20%) in the form of blue crystals, highly soluble in water, and easily absorbed by plants by spraying on the leaves. The purpose of this study was to obtain a dose of Growmore fertilizer best to increase the growth of *Dendrobium* sp. at the acclimatization stage. The research will be conducted from June 2022 – November 2022 at Floculture Farm, Lampung State Polytechnic. From the results, it was found that Growmore fertilizer affected the growth of *Dendrobium* sp. Orchids at the time of observation 3, 5, 7 and 9 WAP.

1. Introduction

Orchid *Dendrobium* sp. is one type of ornamental plant with high potential to be developed in Indonesia both as a cut flower and as a potted ornamental plant. The demand for orchids that continues to increase yearly has not been followed by adequate production. In general, the orchid *Dendrobium* sp. propagated through tissue culture and the final stage of tissue culture is acclimatization. Acclimatization is an essential stage in orchid cultivation, so it requires proper nutrition and maintenance so that it can support the growth and development of orchid seedlings. One important aspect of acclimatization is fertilization. To be fertile and fast flowering, orchid plants need to be fertilized with complete macro and micronutrients. Growmore is a complete foliar fertilizer (N 20%, P₂O₅ 20%, and K₂O 20%) in the form of blue crystals, highly soluble in water, and easily absorbed by plants by spraying on the leaves. The purpose of this study was to obtain a dose of Growmore fertilizer best to increase the growth of *Dendrobium* sp. at the acclimatization stage. The research will be conducted from June 2022 – November 2022 at Floculture Farm, Lampung State Polytechnic. From the results, it was found that Growmore fertilizer affected the growth of *Dendrobium* sp. Orchids at the time of observation 3, 5, 7 and 9 WAP.

2. Methods

The research was carried out at Floriculture Farm, Lampung State Polytechnic, from June 2022 to November 2022. The tools used in this study were plastic pots, nano sprayer, markers, and label paper. The material used in this study was the orchid plantlet *Dendrobium* sp. which has about 3-5 leaves from in vitro cultures aged 12 months from seed germination, fern growing media, Growmore leaf fertilizer (32-10-10), bricks, Dithane M-45 fungicide and Curacron insecticide. The treatment in this study was the application of Growmore leaf fertilizer to the growth of *Dendrobium* sp. at the acclimatization stage. This factor consists of 5 levels of concentration, namely: 0 g/l (G-0); 1.5 g/l (G-1); 3 g/l (G-2); 4.5 g/l (G-3); 6 g/l (G-4).

The concentration of the fertilizer solution is made by mixing each level of concentration of foliar fertilizer used into 1 liter of water, then stirred until evenly distributed. The treatment, namely the application of Growmore fertilizers, was carried out by spraying all parts of the leaves using a nano sprayer. Spraying of foliar fertilizer is done once a week until the plants are 9 weeks old. The spray dose used was 15 ml for each orchid plantlet. The study was arranged in a Randomized Block Design with 4 replications and each replication consisted of 4 experimental units. Observations were made at 3, 5, 7, and 9 WAP with observation indicators in the form of plant height, number of leaves, number of roots, and root length. The similarity of variance between treatments was tested by the Barlett test and additional data was tested by the Tukey test. If the assumptions are met, then the data is analyzed for variance and continued with the Least Significant Difference (LSD) test at the 5% level.

3. Results and Discussion

Based on the results of the study, it was found that the application of Growmore fertilizer had an effect on the observation of plant height, number of leaves, number of roots, and root length. Observations were made at 3, 5, 7, and 9 WAP. In observing plant height, it was found that the dose of Growmore fertilizer of 3 g/l gave the highest plant height of 7.92 cm at 3 WAP; 9.07 cm at 5 WAP; 9.98 cm at 7 WAP, and 11.76 cm at 9 WAP (Table 1). This is presumably because the application of Growmore fertilizer which contains the element N plays a role in spurring the growth of seedling height. The provision of optimal N, P, and K will increase plant growth and development [6].

Table 1. Observation of *Dendrobium* sp. orchid height. at various doses of Growmore Fertilizer

Treatment	3 WAP	5 WAP	7 WAP	9 WAP
G0	6.03 b	6.73 b	7.38 b	8.36 b
G1	5.93 b	6.75 b	7.38 b	8.38 b
G2	7.92 a	9.07 a	9.98 a	11.76 a
G3	5.87 b	6.66 b	7.26 b	8.11 b
G4	5.59 b	6.33 b	7.01 b	7.94 b

The highest number of leaves was produced by the Growmore fertilizer treatment at a dose of 3 g/l. At 3 WAP, the number of leaves was 4.65 leaves, while at 5 WAP the number of leaves was 5.65. For observations at 7 WAP and 9 WAP, the number of leaves was known to be 7.40 and 8.95 leaves, respectively (Table 2). The maximum chlorophyll content in leaves will affect plant growth. With sufficient light intensity, the role of chlorophyll in absorbing light will increase the photolysis process which will produce a substrate that will be used to carry out the dark reaction to produce carbohydrates as a food source for plant cells [7]

Table 2. Observation of the number of leaves of the *Dendrobium* sp. orchid. at various doses of Growmore fertilizer

Treatment	3 WAP	5 WAP	7 WAP	9 WAP
G0	4.15 ab	4.30 b	4.90 b	4.90 b
G1	3.95 b	4.10 b	4.45 bc	4.45 bc
G2	4.65 a	5.65 a	7.40 a	8.95 a
G3	4.05 ab	4.20 b	4.65 b	4.65 bc
G4	3.30 c	3.30 c	4.00 c	4.00 c

Parameters of root number and root length were observed at 9 WAP. The results showed that the application of Growmore fertilizer at a dose of 3 g/l showed the highest number of roots and the longest

root length on *Dendrobium* sp. The highest number of roots was 5.65 and the longest root was 9.07 cm (Table 3). Growmore fertilizer that contains nutrients can meet plant growth. The element of phosphorus in Growmore fertilizer plays a role in helping the growth of roots, shoots, and flowering in plants. On orchids in vitro showed that Growmore fertilizer media produced more roots and plant heights than MS media [8].

Table 3. Observation of the number of roots and root length of the *Dendrobium* sp. on various doses of Growmore fertilizer

Treatment	Number of Roots	Root Length
G0	4.30 b	6.73 b
G1	4.10 b	6.75 b
G2	5.65 a	9.07 a
G3	4.20 b	6.66 b
G4	3.30 c	6.33 b

Orchids are one of the biological wealth, where the privilege of orchid plants is not inferior to other ornamental plants. This type of plant is better known to people than other ornamental plants. Strands of flowers that are arranged in various ways make people not feel bored maintaining orchids [9]. Orchid growth is categorized as very slow. So that to stimulate this growth, it is necessary to substitute fertilization through leaves, and the foliar fertilizer given is foliar fertilizer containing macro and micronutrients, one of which is Growmore foliar fertilizer. Nutrient N contained in Growmore can increase vegetative growth, while phosphorus can stimulate root growth and potassium plays a role in metabolic processes, namely as a catalyst [10].

4. Conclusions

The application of Growmore leaf fertilizer in the acclimatization phase of *Dendrobium* sp. has proven to be able to increase growth in height, number of leaves, number of roots, and root length. This is caused by the content of macronutrients in Growmore leaf fertilizer which can increase vegetative growth. Nitrogen plays a role in stimulating growth in height and number of leaves in *Dendrobium* sp., phosphorus plays a role in stimulating root growth, while potassium plays a role in metabolic processes, namely as a catalyst.

In the study, it was found that the best dose of Growmore fertilizer in the acclimatization phase of *Dendrobium* sp. is 3 g/l (G2). In G2 treatment, higher plant height, number of leaves, number of roots, and root length were produced in each week of observation (3, 5, 7, and 9 WAP) compared to the other 4 treatments.

5. References

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