Agrotech Journal
Url: http://usnsj.id/index.php/ATJ
Email: editor.atj@usnsj.com

Growth Response of Phalaenopsis Seedling on Various Concentrations of Hyponex Leaf Fertilizer

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ARTICLE INFO

e-ISSN: 2548-5148
p-ISSN: 2548-5121
Vol. 7 No. 2, December 2022
URL: http://dx.doi.org/10.31327/atj.v7i2.1766

Abstract

The aim of the study was to determine and analyze the effect of Phalaenopsis seedling growth at various concentrations of Hyponex foliar fertilizer. This study was conducted in Cempalagi Village, Tempe Sub-district, Wajo Regency. By using a randomized block design consisting of five concentrations of hyponex fertilizer, namely: 1.0 g/liter of water, 2.0 g/liter of water, 2.5 g/liter of water, 3.0 g/liter of water and 3.5 g/liter of water. Results of study showed that the concentration of hyponex fertilizer at 2.5g/liter of water obtained the best results on leaf number, leaf length, leaf thickness, root number and root length of Phalaenopsis orchids

Keywords: *Phalaenopsis*, seedling, hyponex, media tanam

A. Introduction

Ornamental plants have been known since centuries ago, because of its beauty that can be used to beautify a house or room and soothe the soul. Thus, this kind of plant is in high demand in the market. During the covid-19 pandemic, ornamental plants had brought new trends and lifestyles as a result of the implementation of WFH (work from home) policy. Many people suddenly showed great interest in plants to channel hobbies, utilise spare time and some even venture to the ornamental plant business. The reasons behind this probably comes from the assumption that taking care of plants is a safe, fun activity, brings peace to mind, it can even be profitable for ornamental plant businessmen, and this activity can be carried out at home.

One of the ornamental plants favoured by the public is orchid. Aside of the stable prices, orchid plants have beautiful flowers, durable and do not wither quickly and fall off so that it can be enjoyed for a long time. Currently, about 750 families, 43,000 species, and 35,000 hybrid varieties of orchids have been identified from all over the world. Indonesia has about 5,000 species. Of that number, 986 species are spread in the forests of Java Island, 971 species are on Sumatra Island, 113 species grow in the Maluku Islands, and the rest can be found in Sulawesi, Irian Jaya, Nusa Tenggara, and Kalimantan (Indonesia, 2019).

Indonesia has at least 25% of the world's flowering plant species. This means that Indonesia is the seventh largest country with a number of species reaching 20,000 species, of which 40 percent are endemic or native to Indonesia. The plant family that has the most species members is the orchids (Orchidaceae) (Indonesia, 2019).

Phalaenopsis is a genus of orchids that has a variety of types and beauty, with approximately 40-60 species. This orchid is one of the prima donna of the orchid business in Indonesia and around in the world. Another feature of Phalaenopsis is that it is able to bloom throughout the year with an average flowering period of one month (Iswanto, 2001). On June 5, 1990, the moon orchid (*Phalaenopsis amabilis* L.) was officially named the national flower, as Puspa Pesona. This orchid has a characteristic pure white flower with a golden yellow tongue.

Orchid propagation by vegetative means is done by growing certain vegetative parts of the parent plant. Through this propagation technique, orchid seedlings with the same genetic characteristics as their parents will be produced. One of these vegetative propagation means is in-vitro.

Plants that are cultured in-vitro are called plantlets which are ready to be transferred to the growing media and cannot grow if they are directly transferred from in-vitro conditions to the field or greenhouse. Therefore, before being transferred, the plantlets must undergo a period of acclimatization by planting in a pot called the Community Pot. The trick is to remove the seeds from the bottle, then wash them thoroughly, after that they are planted with a total of 30 seeds/pot. Then place the pot on a shelf that is topped with 20% paranet and coated with UV plastic.

After going through a period of acclimatization in commnity pot for three to four months, the seeds that have grown larger are separated individually in small pots called Individual Pots (Seedling). After 4 months then transferred back to a larger pot, treated until blossoming.

In the new growing media outside the bottle, both on community pot and on seedling, orchid seeds no longer receive special treatment. In this condition, a suitable growth medium is needed for growth and development. In addition, plant nutrient needs must be supplied from the outside through fertilization. According to Kusmanto (2010) in Nuryani *et al* (2019), it is stated that to achieve optimal fertilization efficiency, fertilizer must be applied in an amount that meets the needs of the plant, not too much and not too little. If the application of fertilizer is higher than needed, the soil solution will be too concentrated thereby poisoning to plants, on the other hand, if the fertilizer is insufficient, the effect of fertilization on plants may not be visible.

Hyponex fertilizer is a product that can be applied to orchids. This fertilizer is a foliar fertilizer in the form of crystals containing many macro and micro nutrients needed by plants. Orchid plants require elements of nitrogen, phosphorus and potassium in sufficient quantities to grow. The elemental content of the leaf fertilizer is expected to be beneficial on the orchid plants' growth. For this reason, research was carried out to determine the right concentration needed by orchid plants to stimulate their growth. Based on this description, a study titled "Growth Response of Phalaenopsis Seedlings in Various Concentrations of Leaf Hypotex Fertilizer" was conducted.

B. Methology

The research was carried out in the form of a randomized design experiment consisting of five concentrations of hyponex fertilizer, namely: h1 = 1.0 g hyponex fertilizer/liter of water, h2 = 2.0 g hyponex fertilizer/liter of water, h3 = 2.5 g hyponex fertilizer/liter of water, h4 = 3.0 g hyponex fertilizer/liter of water and h5 = 3.5 g hyponex fertilizer/liter of water.

The experiment began by choosing a pot as a container for planting media. Selected pots of the same size of 15 cm in diameter and 15 cm in height. The pots were washed and drained, then the pots were arranged according to the treatment.

Plant preparation

Orchid plants of *Phalaenopsis* seedling aged 1 month which not yet produced flowers or were still in community plot were used. Several factors used as consideration in selecting young plant seeds are healthy roots, stems, leaves, has smooth green without spots leaves color, as well as has wide and thick leaves among the existing seedlings.

Selected plants were then repotted, means the act of dismantling the planting media and the plants themselves thoroughly, to replace the old planting media with suitable planting media. Before planting, the plants were soaked in a fungicide solution of 2 g/liter of water for five minutes, then left the plants to dry.

Planting media preparation

Prepared fungicide solution and bactericide solution (Dithane M-45) of 2 g/liter of water were used to soak media in separate place for five minutes, then washed thoroughly and left to dry. Media filling was done by putting the media in each pot according to the treatment with requirement of up to 1 cm below the pot tip.

Planting

Orchid plants were planted in pots with a mixture of mos : roasted husks: red stone fragments: wood charcoal (1:1:1:1). Followed by planting one plant per pot, the plant then was placed in a place under a plastic shade that has been prepared prior.

Fertilization

Fertilization was performed by spraying, according to the treatment. Every plant was treated with 8 ml green hyponex fertilizer once a week for 3 weeks in the morning by spraying it to the leaves and all parts of the plant.

Watering

Watering was carried every day in the morning and evening or depending on the weather and plant conditions. Pest and disease control are carried out if the symptoms appear.

Observation Parameter

Plant growth were observed at the end of the experiment at the age of 12 weeks after planting. The parameters observed were:

1. Leaf Number (leaves)
2. Longest Leaf Length (cm)
3. Leaf Thickness (mm)
4. Number of Roots
5. Root length (cm)

C. Result and Discussion

1. Result

Hyponex fertilizer suggested better results on the number of leaves, leaf length, leaf thickness, number of roots and root length of *Phalaenopsis* orchids. The results obtained were better with the application of 2.5 g hyponex/liter of water compared to other treatments (Figure 1 and Tables 1,2,3,4).

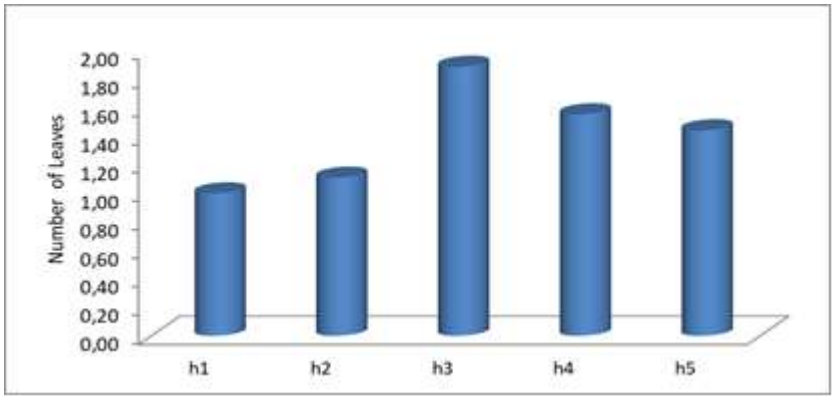

Figure 1. Average number of Phalaenopsis orchid leaves

Table 1. Average leaf length of *Phalaenopsis* orchid plants

Hyponex Concentrations	Average (leaves)	NP LSD ά 0.05
h1	5.67c	
h2	6.87b	
h3	8.03a	0.75
h4	7.20b	
h5	6.97b	

Note: The numbers followed by the same letter mean that they are not significantly different in the LSD test of ά 0.05.

Table 2. Average leaf thickness of *Phalaenopsis* orchid plants

Hyponex Concentrations	Average (mm)	NP LSD ά 0.05

h1	0.044c	
h2	0.047b	
h3	0.067a	0.009
h4	0.055b	
h5	0.054b	

Note: The numbers followed by the same letter mean that they are not significantly different in the LSD test of ά 0.05.

Table 3. Average number of *Phalaenopsis* orchid roots

Hyponex Concentrations	Average (number)	NP BNT ά 0.05
h1	1.11b	
h2	1.22b	
h3	1.89a	0.36
h4	1.44b	
h5	1.44b	

Note: The numbers followed by the same letter mean that they are not significantly different in the LSD test of ά 0.05.

Table 4. Average root length of *Phalaenopsis* orchids

Hyponex Concentration	Average (cm)	NP LSD ά 0.05
h1	1.17c	
h2	1.40b	
h3	2.30a	0.54
h4	1.73b	
h5	1.67b	

Note: The numbers followed by the same letter are not significantly different in the LSD test of ά 0.05.

2. Discussion

The orchid plants' number of leaves were not significantly different at all fertilizer concentration treatments, but it was still seen that the number of leaves tended to be higher when treated a hyponex concentration of 2.5 g/liter of water (Figure 1). The same thing for leaf length, leaf thickness, number and length of roots showed that the application of a hyponex concentration of 2.5 g/liter of water suggested better results which were significantly different from other treatments (Tables1,2,3 and 4). In addition to these results, it was also seen that there were different plant appearances such as better leaf smoothness and freshness at a hyponex concentration of 2.5 g/liter of water compared to other treatments. This is because the hyponex concentration of 2.5 g/liter of water is optimal amount needed to get the maximum effect on plant vegetative growth.

The existence of good vegetative growth allows plant metabolism to take place properly, such as the photosynthesis process by leaves and absorption of water and nutrients by orchid roots that encourage better plant growth. Salisbury and Ross (1995), stated that photosynthetic capacity increased with increasing number of leaves, leaf area and thickness with the assumption that other factors such as light, water, temperature, and nutrients were in optimal conditions.

Moreover, this fertilizer has quite high nitrogen nutrient (200 mg N) which is very good for young or at the seedling stage orchids. Fertilizer application is closely related to the vegetative and generative growth phases. Fertilization treated to young orchid plants should contain a lot of nitrogen with optimal doses. N serves to form amino acids (proteins), nucleic acids, nucleotides, and chlorophyll in plants, so that in the presence of N, plants are greener, accelerate plant growth (height, number of tillers, number of branches) and increase the protein content of crop yields.

The content of nutrient elements in fertilizers that are applied with concentrations that are according to plant needs will allow plants to grow and develop better. Plants treated with hyponex fertilizer with a higher concentration of 3.0 g/liter of water and 3.5 g/liter of water seemed to no longer encourage more active growth, but on the contrary, these concentrations began to suppress the rate of plant growth. This can be seen in all the observation parameters

that are slower or lower in growth. Suseno (1981), states that for optimal plant growth, a balance of nutrients is needed. Furthermore, Setyamidjaja (1986), added that optimal fertilization efficiency can be achieved if fertilizer is treated in suitable amount needed by plants. Excess fertilizer can cause acidic planting media so that the soil texture tends to be harder and not friable. As a result, the activity of earthworms and microorganisms in the soil media can be disrupted. Furthermore, if the fertilizer treated exceeds the optimum concentration, it can cause poisoning in plants.

The low growth at the hyponex fertilizer concentrations of 1.0 g/liter of water and 2.0 g/liter of water, was suspected as the result of insufficient nutrient elements treated to orchid plants, resulted in slow growth.

D. Conclusion

Based on the results of the study, it can be concluded that hyponex fertilizer concentration of 2.5g/liter of water suggested the best results on the number of leaves, leaf length, leaf thickness, number and length of root of the *Phalaenopsis* orchid.

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