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GROWTH AND YIELDS OF BIMA BREBES SHALLOT VARIETY PLANTED USING A FLOATING HYDROPONICS SYSTEM

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ABSTRACT

Shallots are a horticultural crop that has an important meaning for the community, so in Indonesia there are various methods of utilizing narrow land as an empowerment effort in growing shallots, one of which is by means of hydroponics. Hydroponics has various types, one of which is the floating hydroponics system. This study aims to determine the growth and yield of Bima Brebes shallot variety grown using the floating hydroponics system. This research uses a qualitative approach with the Miles and Huberman interactive data analysis model which consists of 3 main things: data reduction, data presentation, and conclusion drawing. Meanwhile, data collection used documentation techniques to collect journals with the keywords shallot and floating hydroponics system from various sources. The results showed that shallots have high economic value and complete nutritional content, making it an important vegetable commodity for the community. Bima Brebes shallot variety is very suitable for planting with this method because it has good characteristics. By using the right tools and materials, the growth of Bima Brebes shallot variety can be successfully implemented in a floating hydroponic system.

KEYWORDS *shallots; hydroponics; floating hydroponics system*

INTRODUCTION

Shallots are a type of tuber plant that has high economic value. The prospect of shallot agribusiness in Indonesia is also quite good, this is indicated by the high demand for this commodity (Rachmawati, et al. 2023). Shallot (*Allium ascalonicum L.*) is a horticultural crop that is getting more and more attention from both the

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public and the government. Over the past few years, shallots have been included in the top six export vegetable commodities together with cabbage, blunkol (cabbage flowers), chilies, tomatoes and potatoes (Sopian, 2021).

The traditional method commonly used in shallot cultivation is to plant it on agricultural land using soil as a growing medium. However, this approach has several limitations, such as the presence of disease and insect risks, difficulties in climate control and plant nutrition, and excessive use of water.

At the moment, Hydroponics is considered as a way out of agricultural problems. Although many other technologies compete to win existence in the eyes of farmers, in fact hydroponics is the main choice. Hydroponics can be an alternative to sustainable agriculture in the future. This is evidenced by the growing use of hydroponic cultivation in several countries. Some of them have even developed rapidly and exported their hydroponic agricultural products to other countries (Oktavia, 2019).

Indonesia itself is an agricultural country. Thus, in an effort to improve the quality of agriculture and use of land that is not used by the community, a method of using narrow land appears as an effort to empower the community with this hydroponic method. The hydroponic system is a farming system that is simple but effective for getting fertile plants and very optimal results (Harsela, 2020). The choice of hydroponics is based on the condition of the reduced land that can be used for farming (Lestari et al., 2020).

Floating Hydroponics System (FHS) is a cropping system in which plant roots are submerged in a non-circulating nutrient solution (Harsela et al., 2020). System Floating Hydroponics System (FHS) in the process must pay attention to the water in the reservoir, the water level and the nutrient content in the water (Kurniawan & Lestari, 2020). The floating raft hydroponic system has advantages over other hydroponic systems, which are simpler, easier and cheaper installation maintenance, optimization of fertilizer and water, optimization of space, and easier and simpler operations. Hydroponic planting can be done on the roof of a building or rooftop farming (Fadhlillah et al., 2019).

Shallot cultivation by utilizing the roof of a building can be done with a hydroponic system. Hydroponics that is easy to do on the roof of a house is a floating raft hydroponic system. Thus, this study aims to analyze the growth and yield of Bima Brebes shallot variety of grown using a floating hydroponics system.

RESEARCH METHOD

The approach used in this research is a qualitative approach that is used to find out or describe the reality of the events under study so as to make it easier to obtain objective data (Adhimah, 2020). A qualitative approach is a process of research and understanding based on a methodology that investigates social phenomena and human problems. In this approach, the researcher creates a complex picture, examines words, reports in detail from the views of respondents, and conducts studies on the situation experienced (Arkandito et al., 2016). While the research model used is the Miles and Huberman interactive analysis model. Qualitative data analysis activities are carried out interactively and continuously

until complete, so that the data is saturated. This analysis consists of 3 main things: data reduction, data presentation, and drawing conclusions (Lisabela, 2019).

In data collection, documentation techniques were used to collect journals with the keywords shallots and floating hydroponics systems from various sources. Then data reduction is carried out, after several relevant journals are obtained, grouping and removing unnecessary data and organizing are carried out. Next, the presentation of data. Presentation of this data began by presenting data from the analysis of various journals regarding the yield of the Bima Brebes shallot variety grown using a floating hydroponics system. The last thing to do is draw conclusions. This conclusion is made after all the data has been analyzed and presented.

RESULT AND DISCUSSION

Shallot Growth

Shallot is a vegetable commodity that has important meaning for the community, both in terms of its high economic value and nutritional content (Sipayung & Sitepu, 2014). Shallot is a superior horticultural crop and has been intensively cultivated by farmers. This horticultural commodity belongs to the non-substitutable spice group and functions as a food flavoring spice as well as a traditional medicinal ingredient (Kurnianingsih et al., 2018).

Shallots contain quite high nutrition and complete composition. In every 100 grams of onion bulbs contains 39.0 calories, 1.5 grams of protein, 0.3 grams of fat, 0.2 grams of carbohydrates, 40.0 mg of phosphorus, 0.8 mg of iron, 0.03 mg of vitamin B1, 2.0 mg of vitamin C, and 88.0 mg of water. In addition to the richness of nutritional content, onion bulbs also contain many chemical compounds. Shallots contain quite high nutrition and complete composition. In every 100 grams of onion bulbs contains 39.0 calories, 1.5 grams of protein, 0.3 grams of fat, 0.2 grams of carbohydrates, 40.0 mg of phosphorus, 0.8 mg of iron, 0.03 mg of vitamin B1, 2.0 mg of vitamin C, and 88.0 mg of water. In addition to the richness of nutritional content, onion bulbs also contain many chemical compounds (Akbar & Yuliani, 2017).

Floating Hydroponics System

Hydroponics is a method of farming without using soil media, but using a solution of nutritious minerals or other materials containing nutrients such as coconut fiber, mineral fiber, sand, broken bricks, sawdust, etc. as a substitute for soil media (Mujriati et al., 2021).The hydroponic method is used to maximize plant growth and production, because with this system, nutrients can be supplied in a controlled and precise manner (Harsela, 2022). The hydroponic system also utilizes water to meet the nutritional needs of plants, as the origin of the word hydroponics is hydro which means water and ponos which means power. However, to grow plants, not just ordinary water is needed, but water that has sufficient nutrients for the plant in question (Kresnha et al., 2019).

Hydroponic farming has many advantages, such as the need for relatively narrow land, low levels of pest and disease attacks due to controlled environmental conditions, increased growth and production (yield) of plants due to more controlled nutrition, efficient use of fertilizers and water, and avoiding plants from

drought, erosion and flooding. Vegetables grown using the hydroponic method are also generally cleaner and have a better taste than conventionally grown vegetables (Warjoto et al., 2020).

Meanwhile according to Roida (2014) the advantages of the Hydroponic System include:

1) The success of plants to grow and produce more guaranteed.
2) Treatment is more practical and pest disturbances are more controlled.
3) Fertilizer use is more efficient (efficient).
4) Dead plants are easier to replace with new plants.
5) It does not require a lot of manual labor because the work method is more efficient and has standardization.
6) Plants can grow more rapidly and in conditions that are not dirty and damaged.
7) Production results are more continuous and higher compared to planting on the ground.
8) The selling price of hydroponics is higher than non-hydroponic products.
9) Some types of plants can be cultivated out of season.
10) There is no risk of flooding, erosion, drought, or dependence on natural conditions.
11) Hydroponic plants can be done on limited land or space, for example on the roof, kitchen or garage.

Weaknesses of the Hydroponic System include:

1) Expensive initial investment.
2) Requires special skills to weigh and mix chemicals.
3) Availability and maintenance of hydroponic devices is somewhat complicated.

The floating raft hydroponic system (FHS) is carried out by placing plants in styrofoam holes floating in a nutrient solution with plant roots submerged. One of the advantages of floating raft hydroponics is that it does not require a lot of planting media, the cost is relatively inexpensive compared to other hydroponic systems and it makes it easier to replace the nutrient solution (Darwiyah et al., 2021).

Growth of the Bima Brebes Shallot Variety using a Floating Hydroponic System

The shallot variety most widely planted by farmers is Bima Brebes because of its high production, tuber weight and large tuber size, resistance to disease (Citra, A. & Firmansyah, 2019) and withstand high rainfall (Sinung et al., 2018). This variety is suitable for planting in the lowlands, but shallot cultivation in the lowlands usually only takes place during the dry season. Shallot planting during the rainy season is usually done on dry land and uplands (Handayani et al., 2021).

The Bima Brebes shallot variety has different characteristics from the highland shallot varieties. Highland shallot varieties have a prominent characteristic, namely that they are much larger in size compared to Bima Brebes. The local shallots have the characteristics of having large tubers, a small number of tillers, disease resistance, and a sharp taste and aroma (Citra & Firmansyah, 2018).

Quoted from Darwiyah et al., (2021) the following are the tools and materials for planting the Bima Brebes Variety Floating Hydroponic System.

Tools used include:

1) Floating Raft Hydroponic Installation in the Form of a 35 Liter Styrofoam Box
2) Black Plastic Polybag Sized 75x50 Cm, Cutter
3) Scissors
4) Solative
5) Handspayer
6) Ph and Ec Meters
7) Accuracy Digital Scales 0.001 gram
8) 1 Gram Accuracy Digital Scales
9) Cutting Scissors
10) Ruler
11) Measuring Tape

Materials used include:

1) Shallot Plant Seeds With the Bima Brebes Variety
2) Planting Media (Cocopeat And Husk Charcoal)
3) Plant Nutrition
4) Potassium Nitrate (Kno3)
5) Potassium Sulfate (K2so4)

Onion plants take 55-60 days for one harvest. Harvesting can be done when the shallot plants are old enough to be around 60 HST, marked by the leaves starting to turn yellow, by removing the entire shallot plant carefully so that no bulbs are scuffed or left behind. For 1 (one) hectare of shallot cultivation, it can produce 10-15 tons. The tubers are dried by spreading them evenly on a mat or by hanging them from the rack, if the weather is hot enough it takes 4-7 days. Shallots that are already a bit dry are then tied in the form of ties. When the tubers are redder, are shiny, the necks of the tubers look hard and rustle is heard when touched, drying can be stopped. Then after the drying process, sorting is carried out (Permana et al., 2021). According to research Niam et al., (2017) that simulation approach *Computational Fluid Dynamics* (CFD) is able to describe the temperature distribution in hydroponic floating rafts well. The validation of the simulation results showed a very good value for shallot growth has also been studied, where low temperature is the best temperature for inducing tuber formation, which produces 200% more tubers compared to the control temperature treatment and around 60% more than the medium temperature treatment.

Backed by research Subandi et al., (2015) which states that the provision of nutrient solutions based on EC (Electrical Conductivity) values can affect the growth and yield of plants with hydroponic floating raft systems (Floating Hydroponics System), because there is an EC value that shows the highest yield.

CONCLUSION

Based on the analysis conducted, it was found that shallot growth is very important for the community because of its high economic value and complete nutritional content. Shallot is a superior horticultural crop that has been cultivated intensively by farmers. Besides having a high nutritional content, shallots also contain useful chemical compounds. Hydroponic methods, such as the Floating Hydroponic System (FHS), are an efficient choice for shallot cultivation. The

hydroponic system has advantages, such as narrow land use, better pest control, and increased plant growth and production. Bima Brebes shallot variety is a variety that is widely planted by farmers because of its high production and disease resistance.

Overall, the growth of shallots has an important value for society. The hydroponic method, especially the floating hydroponic system, is an efficient choice for shallot cultivation. The Bima Brebes shallot variety is very suitable for planting with this method because it has good characteristics. By using the right tools and materials, the growth of Bima Brebes shallot variety can be successfully implemented in a floating raft hydroponic system.

REFERENCES

Adhimah, S. (2020). Peran orang tua dalam menghilangjan rasa canggung anak usia dini (studi kasus di desa karangbong rt 06 rw 02 Gedangan-Sidoarjo). *Jurnal Pendidikan Anak*, *9*(1), 57–62.

Akbar, Y., & Yuliani, P. (2017). Respon Pertumbuhan Dan Hasil Tanaman Bawang Merah (Alium Ascalonikum L) Pada Beberapa Media Tanam. *Jurnal Pertanian UMSB*, *1*(2), 43–49.

Arkandito, G. F., Maryani, E., Rahmawan, D., & Wirakusumah, T. K. (2016). Komunikasi Verbal pada Anggota Keluarga yang Memiliki Anak Indigo. *Jurnal Manajemen Komunikasi*, *1*(1), 42–56.

Citra, A., I., & Firmansyah. (2019). Keragaan pertumbuhan dan produksi bawang merah. *Prosiding Seminar Nasional Kesiapan Sumber Daya Pertanian Dan Inovasi Spesifik Lokasi Memasuki Era Industri 4.0.*, 243–249.

Citra, A., & Firmansyah, I. (2018). Keragaman Pertumbuhan Dan Produksi Bawang Merah Varietas Bima Brebes Dan Lokal Karanganyar Di Dataran Tinggi. *Prosiding Seminar Nasional Kesiapan Sumber Daya Pertanian Dan Inovasi Spesifik Lokasi Memasuki Era Industri 4.0*, 243–249.

Darwiyah, S., N., R., & Setyono. (2021). Produksi Dan Kualitas Melon (Cucumis melo L.) Hidroponik Rakit Apung Yang Diberi Nutrisi Kalium Berbeda. *Jurnal Agronida*, *7*(2), 104–103.

Fadhlillah, R. H., Dwiratna, S., & Amaru, K. (2019). Kinerja Sistem Fertigasi Rakit Apung Pada Budi Daya Tanaman Kangkung (Ipomoea reptans Poir.). *Jurnal Pertanian Tropik*, *6*(2), 165–179.

Handayani, C. O., Dewi, T., & Hidayah, A. (2021). Pengaruh Biochar, Kompos dan Pupuk Hayati terhadap Pertumbuhan dan Produksi Tanaman Bawang Merah Varietas Bima Brebes. *J. Hort. Indonesia*, *12*(3), 198–203.

Harsela, C. N. (2020). Kiat Sukses Bertani Hidroponik. *Google Scholar*.

Harsela, C. N. (2022). Sistem Hidroponik Menggunakan Nutrient Film Technique Untuk Produksi dan Hasil Tanaman Selada (Lactuca sativa L.). *Jurnal Ilmiah Indonesia*, *7*(11), 17137–17144.

Harsela, C. N., Sumarni, E., & Wijaya, K. (2020). Pertumbuhan Pakcoy (Brassica Rapa L) Yang Ditanam Dengan Floating Hydroponics System Dan Non Hidroponik. *Jurnal Pertanian Indonesia*, *1*(2), 56–63.

Kresnha, P. E., Sugiartowo, & Wicahyani, N. L. A. (2019). Automasi Hidroponik Indoor Sistem Wick dengan Pengaturan Penyinaran Menggunakan Growing

Lights dan Pemberitahuan Nutrisi Berbasis SMS Gateway. *Seminar Nasional Sains Dan Teknologi 2019*, 1–8.

Kurnianingsih, A., Susilawati, & Sefrila, M. (2018). Karakter Pertumbuhan Tanaman Bawang Merah Pada Berbagai Komposisi Media Tanam. *J. Hort. Indonesia*, *9*(3), 167–173.

Kurniawan, A., & Lestari, H. A. (2020). Sistem Kontrol Nutrisi Floating Hydroponic System Kangkung (Ipomea reptans) Menggunakan Internet Of Things Berbasis Telegram. *Jurnal Teknik Pertanian Lampung*, *9*(4), 326–335.

Lestari, D., Armaini, & Gusmawartati. (2020). Pengaruh Konsentrasi Nutrisi dan Beberapa Media Tanam terhadap Pertumbuhan dan Hasil Tanaman Seledri (Apium graveolens L.) dengan Sistem Wick secara Hidroponik. *J. Hort. Indonesia*, *11*(3), 183–191.

Lisabela, M. (2019). Model Analisis Interaktif Miles and Huberman. *Universitas Bina Darma*.

Mujriati, A., Nafisah, K., Hayatunnisa, K., & Japa, L. (2021). Pelatihan Budidaya Sayuran Hidroponik Menggunakan Sistem Wicks Sebagai Usaha Pemberdayaan Masyarakat di Desa Cenggu. *Jurnal Pengabdian Magister Pendidikan IPA*, *4*(2), 179–185.

Niam, A. G., Suhardiyanto, H., Seminar, K. B., & Maddu, A. (2017). Simulasi Distribusi Suhu pada Lubang Tanam Hidroponik Rakit Apung untuk Produksi Bawang Merah di Dataran Rendah Tropika. *Jurnal Keteknikan Pertanian (JTEP)*, *5*(3), 235–244.

Oktavia, Y. (2019). Hidroponik Sebagai Alternatif Pertanian Berkelanjutan. *Universitas Andalas*.

Permana, D. F. W., Mustofa, A. H., Nuryani, L., Kristiaputra, P. S., & Alamudin, Y. (2021). Budidaya Bawang Merah di Kabupaten Brebes. *Jurnal Bina Desa*, *3*(2), 125–132.

Rachmawati, V. E., Maarif, M. S., Maharani, M., Deden, D., Dukat, D., & Umiyati, U. (2023). The Effect of Organic Insecticide and Various Cultivars on Attack Intensity of Spodoptera exigua and Results Shallots (Allium Ascalonicum L.). *Eduvest-Journal of Universal Studies*, *3*(7), 1340-1346.

Roidah, I. S. (2014). Pemanfaatan Lahan Dengan Menggunakan Sistem Hidroponik. *Jurnal Universitas Tulungagung BONOROWO*, *1*(2), 43–50.

Sinung, R. B., Kharitiyatun, N., A. Sembiring, I. W., & Arsanti. (2018). Studi adopsi varietas bawang merah bima brebes dari Balitsa di Kabupaten Brebes. *J. Hort*, *27*(2), 261.

Sipayung, W. A. T. R., & Sitepu, F. E. (2014). Growth and Production of Shallot (Allium ascalonicum L.) to the Application of Biofertilizer in the Variety of Plants Media. *Jurnal Online Agroekoteknologi*, *2*(2), 825–836.

Sopian, A. (2021). Analisis Pertumbuhan Dan Produksi Tanaman Bawang Merah Dengan Pemberian Pupuk Mono Kalim Phosphate Pada Tanah Sub Obtimal. *Jurnal AGRIFOR*, *20*(1), 17–24.

Subandi, M., Salam, N. P., & Frasetya, B. (2015). Pengaruh Berbagai Nilai Ec (Electrical Conductivity) Terhadap Pertumbuhan Dan Hasil Bayam (Amaranthus Sp.) Pada Hidroponik Sistem Rakit Apung (Floating Hydroponics System). *Journal UIN SGD*, *9*(2), 136–152.

Warjoto, R. E., Mulyawan, J., & Barus, T. (2020). Pengaruh Media Tanam Hidroponik terhadap Pertumbuhan Bayam (Amaranthus sp.) dan Selada (Lactuca sativa). *Jurnal Penelitian Pertanian Terapan*, *20*(2), 118–125.