International Journal in Management and Social Science
Volume 10 Issue 3, March 2022 ISSN: 2321-1784 Impact Factor: 6.319
Journal Homepage: http://ijmr.net.in, Email: irjmss@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal

AN OPTIMIZATION OF PRODUCTION OF SOME VARIETIES OF Shallot (Allium ascalonicum L.) ORIGIN ON SEED ON PGPR

Zamriyetti[1], Sulardi[2], Tengku Siti Habsyah[3]
Panca Budi University of Development
zamriyetti@dosen.pancabudi.ac.id

ABSTRACT

One way to increase the amount of shallot production in order to meet the demand is the application of a seed planting system known as the "true shallot seed system" and the provision of Plant Growth Promoting Rhizobacteria (PGPR). This research was conducted in Sunggal District, North Sumatra from February to May 2022. This study used a factorial randomized block design consisting of 2 treatment factors, namely factor I was the onion variety with the symbol (V) consisting of V1: lokananta variety, V2: sanren and V3: maserati. Factor II is the provision of PGPR (Plant Growth Promoting Rhizobacteria) with the symbol (P) consisting of P0: without PGPR, namely: P1: 50 ml/liter of water/per plot, P2: 100 ml/liter of water/per plot, P3: 150 ml/liter of water/per plot.

Keywords: Variety, Shallots, PGPR

INTRODUCTION

The use of tubers as seeds for a long time continuously resulted in a decrease in shallot yields both quantitatively and qualitatively. The decrease in yield is thought to be the result of low-quality seeds (Wulandari et al., 2014)

True shallot seed (TSS) is a system of growing shallots using botanical seeds. Botanical seeds are shallot seeds produced from mature shallot flowers/umbels (planting period of about four months) and processed as seeds. The use of TSS will reduce the need for bulbs/seeds in an area and can increase the quality and quantity of shallot bulbs (Sumarni and Hidayat, 2012).

Shallot cultivation using technology (True Shallot Seed/TSS) is free from viruses and seed-borne diseases, reduces seed costs, can produce healthier plants and high yields, and saves production costs. Doubled the productivity of 36.2 – 42.5 tons/ha with the use of true shallot seed as a seed source compared to tubers produced by farmers from 17.1 -23.2 tons/ha and resulted in healthier plants and produced tubers with better quality (Erythrina, 2013).

The strategy to increase the growth and production of shallots in addition to using True shallot seed (TSS) is to use PGPR (plant growth promoting rhizobacteria) or rhizobacteria. Rhizobacteria are soil microorganisms that are one of the factors that play an important role in restoring soil fertility. PGPR's role in increasing plant growth and production is thought to have

something to do with the ability to synthesize growth hormones. Bacillus sp. isolates were reported to be able to synthesize indole acetic acid (IAA) and gibberellins. Meanwhile, isolates of P. fluorescens, in addition to producing IAA, also produced cytokinins (A'yun, 2013).

LITERATURE REVIEW

The shallot planting system with true shallot seed (TSS) is the cultivation of shallots using seeds. True seeds / botanical seeds are ripe ovules that have been fertilized and have an embryo, food reserves, and a protective layer. Seeds are round, flattened, wrinkled with an irregular shape, and have a black protective coating. Seeds are produced from ripe onion flower umbels (Sumarni and Hidayat, 2012).

A plant variety is one of the main factors that determine success in plant cultivation. The use of quality varieties can reduce the risk of cultivation failure because it is free from pests and diseases and can grow well in unfavorable land conditions. Seeds, seeds, and seedlings are almost the same terms, so they are confused in their use. Several varieties of shallots can flower, except for the Sumenep variety, which cannot flower in tropical ecosystems in Indonesia (Suwandi 2014).

The use of biological methods, in addition to increasing the production of shallots, also does not damage the environment. Plant Growth Promoting Rhizobacteria (PGPR) is also reported as a key element in balancing plants under nutrient-stress conditions and can reduce the impact of using chemical fertilizers and support environmentally friendly agricultural production (Ahemad & Kibret, 2014).

Plant Growth Promoting Rhizobacteria have a role in spurring plant growth other than through direct mechanisms but also through indirect mechanisms such as inhibition of phytopathogenic growth by antimicrobial compounds, competition in iron chelating through the production of siderophores, competition for space and nutrients released by roots. Egamberdiyef et al., 2017)

RESEARCH METHODS

This research was carried out in the research area in Sunggal District, North Sumatra, from February to May 2022. The materials used are three varieties of shallots, namely lokananta, scanner, Maserati, bamboo roots, EM4, belacan, bran, molasses, and lime. The tools used in this study were a hoe, member, bucket, barrel, ruler, standard peg, and rope.

This study used a factorial randomized block design (RAK) which had three blocks. The first factor is lokananta, scanner, and Maserati varieties, and the second factor is Plant Growth Promoting Rhizobacteria (PGPR)0 ml/liter of water / per plot, 50 ml/liter of water / per plot, 100

ml/liter of water / per plot, 150 ml/liter of water / per plot. The parameters were the number of tubers (tubers) and the dry weight of tubers.

DISCUSSION RESULT

4.1. Number of Bulbs (tubers)

The results of the analysis showed that the variety and PGPR showed a very significant effect on the number of tubers and the interaction between the two showed no significant effect.

Table 1. Average Number of Bulbs (tubers) of Several Shallot Varieties due to PGPR Administration.

Varieties	Plant Growth Promoting Rhizobacteria (PGPR)				Average
	P0	P1	P2	P3	
V1 (Lokananta)	1.33	1.58	1.63	1.88	1.60 a
V2 (Sanren)	1.00	1.21	1.08	1.42	1.18 b
V3 (Maserati)	1.04	1.00	1.08	1.21	1.08 b
Average	1.13 b	1.26 b	1.26 b	1.50 a	

Information: The numbers followed by the same letter show no significant difference according to the Multiple Distance Test (Duncan) at the 5% level (lowercase).

The highest number of tubers was Lokananta variety (V1) and the lowest was Maserati variety (V3). In PGPR administration, the highest number of tubers was P3 (150 ml/liter water/plot) and the lowest was P0 (without PGPR). This shows that the photosynthesis process takes place optimally. The nutrient content in the applied PGPR can be optimally absorbed by plants to help their metabolic processes, such as the formation of carbohydrates which are translocated in the formation and enlargement of tubers (Tuhuteru et al., 2016).

Shallots from TSS tend to have fewer bulbs than plants from bulbs. The addition of PGPR can increase the number of cells that are actively dividing, so that the storage of carbohydrates as food reserves becomes more and more (Ula et al., 2018).

4.2. Dry Bulbs Weight (g)

The results of the analysis showed that the variety and PGPR showed a very significant effect on dry tuber weight and the interaction between the two showed no significant effect.

Table 2. Average Weight of Dry Bulbs (g) Several Shallot Varieties due to PGPR Administration.

Varieties	Plant Growth Promoting Rhizobacteria (PGPR)				Average
	P0	P1	P2	P3	
V1 (Lokananta)	15.67	19.50	21.09	19.38	18.91 a
V2 (Sanren)	15.09	15.50	14.38	21.50	16.62 b
V3 (Maserati)	13.13	14.25	16.46	18,17	15.50 b
Average	14.63 b	16.42 b	17.31 a	19.68 a	

Information: The numbers followed by the same letter show no significant difference according to the Multiple Distance Test (Duncan) at the 5% level (lowercase).

The highest dry tuber weight was obtained on the Lokananta variety and the lowest on Maserati. At a dose of PGPR P3 (150 ml/liter of water/plot) resulted in the highest dry tuber weight. The microbes contained in the applied PGPR are able to help plants absorb nutrients in the soil in accordance with the role of PGPR as a biofertilizer that helps plants in accelerating the absorption of nutrients. similar to the weight of fresh stover bulbs, the formation of biomass in the form of dry tuber weight (Tuhuteru et al., 2017).

The dry weight of the plant is related to the photosynthate yield that is able to be absorbed by the plant. This is in line with Putrie's research (2016) which states that the use of PGPR agents increases seed vigor, plant height, wet weight, and plant dry weight.

Soil contains many microorganisms, some of which tend to colonize around plant roots/rhizosphere and have beneficial activities for plant growth both directly and indirectly and can contribute to replacing inorganic inputs. This group of microorganisms is called plant growth promoting rhizobacteria (PGPR) (Ahemad & Kibret, 2014). These beneficial microorganisms can be a significant component in management management to achieve yields, which emphasizes that crop yields are not only limited by the plant's natural physical environment and innate genetic potential (A'yun et al., 2013).

CONCLUSION

Optimizing the production of several varieties of shallot from seed by giving PGPR led to an increase. Lokananta variety with a PGPR dose of 150 ml/per liter of water produced the highest number of tubers and dry bulb weight.

REFERENCES.

A'yun, KQ, Hadiastono, T., & Martosudiro, M. (2013). Effect of using PGPR (Plant Growth Promoting Rhizobacteria) on TMV (Tobacco Mosaic Virus), Growth, and Production of Cayenne Pepper (Capsicum frutescens L.). HPT Journal, 1(1), 47–56.

Ahemad, M., & Kibret, M. (2014). Mechanisms and applications of plant growth promoting rhizobacteria: Current perspective. Journal of King Saud University - Science, 26(1), 1–20.https://doi.org/10.1016/j.jksus.

Egamberdiyef, Galih, Halim & Retno. 2017. Mechanism of Resistance Induced by Plant Growth Promoting Rhizobacteria (PGPR) in Chili Plants Infected with Cucumber Mosaic Virus (CMV). Department of Plant Protection, Faperta, IPB, Bogor.

Erythrina, 2013. Seedling and Cultivation of Shallots, National Seminar on Agricultural Technology Innovation to Support Food Security and Sustainable Rice Self-Sufficiency in North Sulawesi, Center for the Assessment and Development of Agricultural Technology, Bogor.

Putrie, RTW (2016). Plant Growth Promoting Rhizobacteria (PGPR) Producing Exopolysaccharides As Inoculants in Dry Land Agricultural Areas. Bio Trends 7(1):35-41. BioTrends, 7(1), 35-41.

Sumarni, N and A. Hidayat. 2012. Shallot Cultivation. Research Institute for Vegetable Crops. Bandung. pp. 19-22.

Suwandi. 2014. Off-season Shallot Cultivation Leading Technology Anticipating the Impact of Climate Change. Catalog. Agricultural Research and Development Agency of the Ministry of Agriculture. 35 p.

Tuhuteru, S., Sulistyaningsih, E., & Wibowo, A. (2017). Effects of Plant Growth Promoting Rhizobacteria (PGPR) on Growth and Yield of Shallot in Sandy Coastal Land. Agricultural Science, 1(3), 105.https://doi.org/10.22146/ipas.16349.

Ula, S., Sunaryo, and N. Barunawati. 2018. Growth Response and Yield of Shallots (Allium cepa var. ascalonicum L.) Bima Varieties to Phosphorus Dose and Time of PGPR Application. Journal of Plant Production. 6(10): 2736 – 2742.

Wulandari, A, Purnomo, D & Supriyono 2014, 'The Potential of True Shallot Seeds as Planting Materials for Shallot Cultivation in Indonesia, EL VIVO, vol. 2, no. 1, p. 28-36.