DOI :https://doi.org/10.36378/juatika.v4i2.1873
JUATIKA
JURNAL AGRONOMI TANAMAN TROPIKA
VOL.4 NO. 2 July 2022
eissn 2656-1727
pissn 2684-785X
Hal : 306 – 319

Test Of Various Bulbil Sizes And Dolomite Dosages On Porang (*Amorphophallus muelleri* Blume.) Growth In Peat Media

M. Amrul Khoiri, Anthony Hamzah, Muhammad Yudira, Ardian, Angga Pramana*
Agrotechnology Study Program, Faculty of Agriculture, Riau University
Riau University Bina Widya Campus Km. 12.5 New Simpang Pekanbaru (28293)
*email: pramana.angga@lecturer.unri.ac.id

ABSTRACT

Porang plant (*Amorphophallus muelleri* Blume.) is one of the plants that have the potential to be cultivated in peatlands needed to increase its production. This study aims to increase the growth of smallholder plants on peat media until six months after planting through bulbil size with dolomite treatment. The research type was a 4x3 factorial experiment arranged based on a Completely Randomized Design (CRD). The first factor is bulbil size which consists of four levels, e.g., B1 (5.0 g-7.5 g), B2 (>7.5 g-10 g), B3 (>10 g-12.5 g), B4 (> 12.5 g-15.0 g) and the second factor dose of dolomite consists of three levels, e.g., D1 (2.5 ton.ha-1) D2 (5.0 ton.ha-1) D3 (7.5 ton.ha-1) -1). These two factors resulted in 12 treatment combinations, with three repetitions. Each experimental unit consisted of three plants. Parameters observed were growth power, plant height, stem diameter, crown width, rachis length, number of leaves, number of tillers, and number of tubers formed. The results showed that the application of dolomite could improve some of the chemical properties of peat soil. The bigger the bulbil size, the better the growth of people and the administration of 7.5 tons of dolomite.ha-1 increased several plant growth parameters such as growth power and plant height.

Keywords: *Bulbil, Dolomite, Porang, Peat*

1. INTRODUCTION

Porang plant (Amorphophallus muelleri Blume.) is a promising prospective plant with high economic value. The need for porang continues to increase along with requests from abroad. Data from the BPS Kabupaten Madiun (2021) shows that the production of porang in Madiun in 2018 was 8,704 tons of wet bulbs, while the porang productivity in Madiun was 5.67 tons ha-1 of wet bulbs per year. According to Kementrian Pertanian (2020), East Java Province in 2017 exported 4.3 tons of porang chips worth IDR 61 billion, and in 2018, 5.5 tons of chips worth IDR 77 billion. Intensively cultivated, it decreases tubers porang seeds availability because growing porang plants is not easy, and the cultivation time is quite long. Based on the constraints found in porang, it indicates that efforts must be made to increase porang production and productivity through other planting materials for porang plant propagation.

Porang can be propagated in several ways, such as: using tubers, tubers, bulbils, seeds, and leaf cuttings (Handayani dan Yuzammi, 2016). Bulbil is a planting material that can be planted immediately and save time among the several types of planting material. However, planting material in the form of bulbil has a low level of uniformity, so it is necessary to study the size of bulbil that is effective as planting material. Based on Firdaus et al. (2022) research, bulbil measuring 2.5 g and 5 g can be used as planting material for porang propagation. In addition to using propagation materials, efforts are needed to increase porang and extensification production and productivity.

Extensification is an effort to increase production by expanding the land area by utilizing the land to be developed as a planting area. One of the planting areas that can be used is peatland. The limitations of agricultural land encourage us to start using marginal lands such as peatlands. According to Mutaqin et al. (2021), porang can grow on various soil types. Therefore, peatlands have the potential for porang cultivation.

Indonesia has 20.2 million hectares (ha) of peatland area; in Riau Province, it is approximately 4.04 million hectares (ha) (Mubekti, 2011). Peatland for porang cultivation has many obstacles, including the pH of the soil that reacts acidly to become very acidic, and the cation exchange capacity (CEC) is high. However, base saturation is very low, and the C/N ratio of peat is very high, causing the availability of nutrients to be lacking. Peat also contains organic acids that are toxic to plants (Girkin et al., 2018).

The utilization of peatland for porang plants planting area requires several treatments to increase its productivity. It can be done by giving ameliorants, one with dolomite lime. According to Gultom and Adnan et al. (2021), dolomite lime CaMg $(CO_3)_2$ is a type of lime with a very high basic level. According to Suntoro et al. (2018), applying dolomite can increase soil pH and increase the Ca and Mg nutrient availability needed by plants. Based on the research results by Noza et al. (2014), dolomite at a 4-ton.ha-1 dose treatment significantly affected the vegetative growth of sweet corn on peatlands.

This study aimed to increase the growth of porang (Amorphophallus muelleri Blume.) on peat media until six months after planting by using bulbil size and dolomite treatment.

2. MATERIAL AND METHOD

This research has been carried out in the Technical Management Unit of Experimental Gardens, Faculty of Agriculture, University Riau at the Bina Widya Campus Km 12.5, Simpang Baru Village, Tampan District, Pekanbaru, with an altitude of 20 meters above sea level. This research was conducted from October 2020 to April 2021.

The materials used were bulbil porang, peat soil, polybag size 50 cm x

40 cm, chicken manure, dolomite, fungicide Antracol 70 WP, insecticide Curacron 500 EC water, aquades, urea fertilizer, TSP fertilizer, and KCl fertilizer. The tools used include analytical scales, hoe, meter, machete, hammer, digital caliper, digital scale, shading net, 65% para net, bucket, watering can, hand sprayer, mask, camera, and stationery.

This study is a 4x3x3 factorial experiment arranged according to a completely randomized design (CRD). Each experimental unit consists of three plants. The first factor is bulbil size, consisting of four levels, e.g., B1: bulbil size 5.0-7.5 g; B2: Bulbil size >7.5-10.0 g; B3: Bulbil size >10.0-12.5 g; B4: Bulbil size >12.5-15.0 g.The second factor is the dose of dolomite which consists of three levels, i.e., D1: Dolomite administration 2.5 ton.ha-1 (22.5 g per plant), D2: Administration of dolomite 5.0 ton.ha-1 (45.0 g per plant), D3: Dolomite 7.5 ton.ha-1 (67.5 g per plant). The stages of this research can be seen in the following figure:

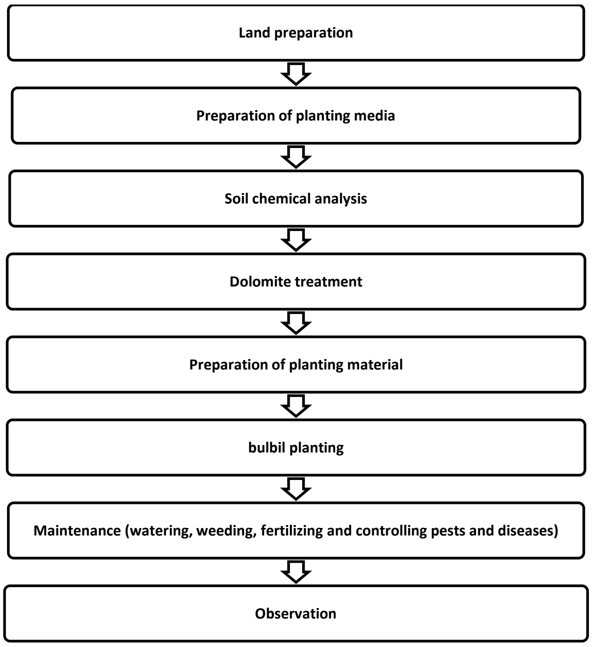

Figure 1. Stages of research implementation

Parameters observed were growth power (%), plant height (cm), stem diameter (mm), rachis length (cm), number of leaves (strands), number of leaflets (strands), and canopy width (cm), and number of bulbils. The data obtained from the study results were analyzed statistically by analysis of variance using SPSS 23 Version. The variance analysis results were further tested with Duncan's New Multiple Range Test (DNMRT) at the 5% level.

3. RESULTS AND DISCUSSION

The variance results showed that the interaction of bulbil and dolomite sizes had no significant effect on all observation parameters, such as germination, plant height, apparent stem diameter, rachis length, number of leaves, and number of leaflets, canopy width, and number of bulbils. The single factor of bulbil size had a significant effect on all observation parameters, and the single factor of dolomite dose only significantly affected the percentage of germination and plant height.

Analysis of soil chemical properties before incubation

Analysis of the chemical properties of the initial peat soil is presented in Table 1.

Table 1. Chemical properties of initial peat

Soil chemical properties	Unit	Score	Criteria*
pH H2O (1:5)	-	3.40	Very sour
pH KCl	-	3.06	-
C-organic	%	25.25	Very high
N-total	%	0.21	Currently
C/N	%	29.36	Very high
P Bray I	ppm	9.08	Currently
K-dd	me.100 g-1	0.18	Low

Source: Bay et al. (2021)
*) Dariah et al. (2013)

Table 1 shows that the peat soil used in the study is classified as less fertile. It is characterized by chemical properties, e.g., very acidic pH, moderate total N, very high C/N, medium available P, and low K-dd. Peat has a high acid soil pH of 3.40. That is because peat contains a lot of organic acids, especially peat dominated by vegetation. According to Ilham et al. (2019), peat soil-forming materials come from natural vegetation (plant and animal remains). Gross dan Glaser (2021) explained that the pH value of the soil, which is classified as very acidic, is due to the ongoing decomposition process in peat soil. The C/N ratio of peat soil is classified as very high at 29.36. Based on the soil analysis results from Septina et al. (2020), the C/N ratio of peat soil originating from the Rimbo Panjang area is very high at 35.39. The N-total content of peat soil is classified as high at 0.21%. According to Kleber dan Lehmann (2019), almost 98% of total soil N is in the form of organic compounds.

On the other hand, plants absorb elemental N in the form of compounds NH4+ and NO3-. These two compounds will be formed through aminization, ammonification, and nitrification processes. P-available content in peat soil is moderate (9.08 ppm). According to Ilham et al. (2019), Elements of Phosphorus (P) in peat soils are primarily found in the form of P-organic, which will then undergo a process of mineralization into P-inorganic by microorganisms. The K-dd value obtained is 0.18 me—100 g-1 (very low).

Figure 2. appearance of peat soil used as research planting medium

Germination power

The further test of DNMRT at the 5% level of germination can be seen in Table 2.

Table 2. The average percentage of germination (%) in the treatment of bulbil size and dolomite dose in peat media

Bulbil Size (g)	Dolomite Dosage (ton.ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	33.00 a	44.33 a	55.67 a	44.33 c
7.5-10.0	44.33 a	44.33 a	55.67 a	48.11 bc
10.0-12.5	44.33 a	67.00 a	78.00 a	63.11 ab
12.5-15.0	67.00 a	67.00 a	89.00 a	74.33 a
Average	47.16 b	55.67 b	69.58 a	

Numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level.

Table 2 shows that the larger the bulbil size, the higher the percentage of porang bulbil germination. The germination percentage due to differences in bulbil size is related to the number of food reserves available in the bulbil. This result is in line with Sumarwoto's (2004) research that large bulbils have more food reserves to support the faster growth of porang plants. The results of research by Zaragoza-Puchol et al. (2021) showed that whole bulbils in various sizes and pieces gave a high germination value (>90%), except for small bulbils, which gave a low percentage of germination (±60%).

Table 2 shows that the larger the dose of dolomite given, the higher the germination percentage. The percentage of bulbil porang germination is related to the pH of the medium. Each plant has different growing conditions. According to Mulyaningsih et al. (2022), porang plants can grow on various soil types and grow ideally at pH 6-7. Based on the results of soil analysis in the study, as the dose of dolomite increases, the pH of the peat media tends to increase, resulting in the percentage of bulbil porang germination. According to Hani et al. (2021), the seedling media's low pH showed higher germination and viability of jelutong seed germination. It is because jelutung plants live in swamp areas.

The observations when the sprouts appeared above the soil surface showed that the bulbil size and the dose of dolomite could increase the germination of the porang bulbil. The time of germination emergence based on bulbil size and dolomite dose of dolomite can be seen in Figure 1.

Figure 3. Percentage of germination of various sizes of bulbil porang (A) and dose of dolomite (B) on peat media

Figure 1A shows the bulbils have not germinated at 2 WAP and only about 50% germinated at 4 WAP. The difference in germination to bulbil size occurred at the age of 6 WAP, where bulbil with the smallest size had about

50% germination power, while bulbil with a larger size had germination above 50%. At week eight, almost all bulbil have germinated. It indicates that the porang bulbil takes two weeks to carry out the water imbibition and reshuffle food reserves. Based on research by Pancaningtyas et al. (2014), along with the imbibition process, the food reserves in the form of starch in cocoa seeds will be converted into sugar by the amylase enzyme to produce energy that is useful for cell activity and growth.

Figure 1B shows that the bulbil porang at 2 MST has not germinated. Differences in germination at various doses of dolomite were seen in the fourth week, where bulbil grown with a dose of 2.5 ton.ha-1 to 5.0 ton.ha-1 had germination rates below 50%, while bulbil grown with a dose of 2.5 ton.ha-1 to 5.0 ton.ha-1 had germination rates below 50%. Planted on peat soil with a dose of dolomite 7.5 ton.ha-1 has a germination rate above 50%. Bulbil treated with dolomite 7.5 ton.ha-1 germinated 100% at the age of 8 WAP.

Figure 4. Porang plant growth stage from bulbil, A) Plumula began to appear (4 WAP) B) Completely opened leaves (8 WAP)

Plant height

The further test of DNMRT at the 5% level of porang plant height can be seen in Table 3.

Table 3. Average porang plant height (cm) on peat media with bulbil size treatment and dolomite dose

Bulbil Size (g)	Dolomite Dosage (ton.ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	20.07 a	21.94 a	25.81 a	22.61 c
7.5-10.0	22.17 a	23.71 a	25.59 a	23.82 c
10.0-12.5	27.24 a	28.18 a	29.18 a	28.20 b
12.5-15.0	30.47 a	34.43 a	37.58 a	34.16 a
Average	24.98 c	27.06 b	29.54 a	

Numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level.

Table 3 shows that the larger the bulbil size, the higher the porang plant. The difference in plant height is due to differences in germination, so they carry out photosynthesis earlier to meet energy needs at the next growth stage. According to Ashagrie et al. (2021), plant height was influenced by bulbil's initial food reserve conditions. Bulbils that have more food reserves have a faster growth rate so that they are earlier in photosynthesis and faster in forming plant vegetative organs. The Sumarwoto Study (2004) results also showed that bulbil plants could produce heights of 20-50 cm in one planting period.

Table 3 shows that the higher the dose of dolomite given, the higher the porang plant. The effect of dolomite dose on plant height in this study was related to the effect of dolomite as an ameliorant in changes in soil chemical properties. According to Soedarjo et al. (2020), porang plants have an ideal soil pH of 6-7. The results of soil pH measurements (H2O) showed that increasing the dose of dolomite increased the pH of peat soil from 4.16 for the administration of 2.5 ton.ha-1 dolomite to 4.86 for the 5.0 ton.ha-1 dose of dolomite. And 5.55 for dolomite dose of 7.5 ton.ha-1. Adnan et al. (2021) stated that lime application could increase soil pH and create good soil conditions for soil microorganisms.

Pseudo Rod Diameter

The results of the DNMRT further test at the 5% level of the pseudo porang stem diameter can be seen in Table 4.

Table 4. The mean pseudostem diameter of porang plants (mm) on peat media with bulbil size and dolomite dosage treatment aged 23 WAP

Bulbil Size (g)	Dolomite Dosage (ton.ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	8.00 a	8.15 a	8.33 a	8.15 c
7.5-10.0	7.70 a	9.32 a	9.94 a	8.98 c
10.0-12.5	9.99 a	11.98 a	11.86 a	11.27 b
12.5-15.0	12.90 a	13.00 a	15.78 a	13.89 a
Average	9.64 b	10.61 ab	11.47 a	

Numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level.

Table 4 shows that the larger the bulbil size, the larger the diameter of the porang stem. Almost the same thing was found in Handayani et al. (2020) research, which states that stem diameter is closely related to tuber diameter for plant propagation. According to Sumarwoto (2004), large bulbil size (diameter > 2.5 cm) produces a stem diameter of 9.42 mm, while bulbil is medium (diameter 1.5-2.5 cm) and small (< 1.5 cm). produced stem diameters of 8.21 mm and 8.13 mm six months after planting. Bulbils that have more food reserves have a greater growth speed so that they are earlier in photosynthesis and faster in forming vegetative organs.

Table 4 shows that the average stem diameter of porang plants increased with the dose of dolomite given. The difference in stem diameter due to different doses of dolomite in this study was related to increasing the pH of peat soil on the availability of N, P, and K nutrients for plants. The results of Ariffin et al. (2020), liming peat soil can increase ammonium (NH4+) and nitrate (NO3-) levels. Its causes the N uptake of plants to increase with the addition of dolomite and stimulates the decomposition of organic matter through a perfect decomposition process. In addition to increasing the pH of peat soil, dolomite also provides the elements of Ca and Mg needed by plants. Suntoro et al. (2018) stated that the application of dolomite could increase the availability of Ca and Mg in the soil,

Figure 5. Porang plant height measurement A) control B) best treatment

Long Rachis

The DNMRT further test at the 5% level on the length of the porang rachis can be seen in Table 5.

Table 5. The average length of porang rachis (cm) on peat media with bulbil size and dolomite dose treatment

Bulbil Size (g)	Dolomite Dosage (ton.ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	13.01 a	11.12 a	12.98 a	12.37 c
7.5-10.0	13.49 a	14.08 a	12.73 a	13.43 bc
10.0-12.5	13.72 a	17.48 a	15.92 a	15.70 b
12.5-15.0	16.09 a	17.55 a	22.42 a	18.68 a
Average	14.07 a	15.06 a	16.00 a	

Numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level.

Table 5 shows that the larger the bulbil size, the longer the rachis. The increase in rachis length was influenced by the plant height and stem diameter of porang plants. The rachis length had a robust positive correlation (r=0.930) and (r=0.936) with plant height and stem diameter. The correlation between plant height and stem diameter with rachis length shows a close relationship. If plant height and stem diameter parameters increase, the rachis length will also increase. This result is supported by Wahidah and Afiati's (2022) statement that the increase in rachis length in Suweg and *iles-iles* was caused by an increase in plant height and stem diameter from 19-24 WAP.

Table 5 shows that the average length of rachis in the administration of dolomite is 7.5 tons/ha, resulting in a better rachis length than the amount of other dolomite administration. It indicates that the ameliorant application in the form of dolomite can increase the availability of nutrients in influencing the rachis length. According to Suntoro et al. (2018), an increase in soil pH affects P uptake by maize roots (Zea mays L.). Elemental P will stimulate the roots of porang plants so that the roots are better at absorbing nutrients used by plants in forming tissues, including stems. Based on the correlation results above, the greater the diameter of the stem, the greater the rachis elongation.

Number of Leaves

The DNMRT further test at the 5% level on the number of porang leaves can be seen in Table 6.

Table 6. The average number of porang leaves on peat media with bulbil size and dolomite dose treatment

Bulbil Size (g)	Dolomite Dosage (ton.ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	3.00 a	3.00 a	3.00 a	3.00 b
7.5-10	3.00 a	3.00 a	3.00 a	3.00 b
10-12.5	3.00 a	3.11 a	3.11 a	3.07 b
12.5-15.0	3.44 a	3.67 a	3.33 a	3.48 a
Average	3.11 a	3.19 a	3.11a	

Numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level.

Table 6 shows that the larger the bulbil size, the more number of leaves formed. The highest number of leaves came from bulbil with 12.5-15.0 g, which was 3.48 strands. That shows that the number of leaves is influenced by bulbil size other than bulb size and plant age. Sumarwoto's (2004) study states that the number of leaves is influenced by the tuber's size and the porang plant's age. According to Hidayat (2019), A paeoniifolius can produce 2-5 leaves with 2-3 leaves that can coexist in the first year. It is comparable to the research results that A. muelleri has 3-4 leaves in its first year.

Table 6 shows that increasing the dose of dolomite has not increased the number of leaves on porang plants. Its mean indicates that differences in nutrient availability due to dolomite doses have not affected the leaves produced. The study results by Carvalho et al. (2018) stated that the number and size of leaves were influenced by the growing environment and the availability of nutrients. Visually, porang leaves become greener and thicker. It is due to the Mg nutrient contained in dolomite. According to Pranckietienė et al. (2020), magnesium forms green leaf matter (chlorophyll) and plays a role in phosphate transport in plants.

Number of Leaflets

The DNMRT further test at the 5% level on the number of leaflets of porang plants can be seen in Table 7.

Table 7. The average number of porang leaves on peat media with bulbil size and dolomite dose treatment

Bulbil Size (g)	Dolomite Dosage (ton.ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	9.11 a	9.44 a	9.56 a	9.37 b
7.5-10	9.56 a	9.33 a	10.00 a	9.63 b
10-12.5	9.33 a	10.89 a	10.33 a	10.18 b
12.5-15.0	11.00 a	11.22 a	11.78 a	11.33 a
Average	9.75 a	10.22 a	10.41 a	

Numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level.

Table 7 shows that the larger the bulbil size, the more leaflets are formed. The number of leaflets on porang plants from bulbil size 12.5-15.0 g is 11.33. The increase in the number of leaflets is related to the initial nutrients contained in the bulbil, which will result in differences in the speed of growth in these plant organs.

The increase in the number of leaflets was caused by the number of leaves and plant height. The more the number of leaves and the increase in plant height, the more leaflets formed. The number of leaflets was strongly correlated (r=0.807) and (r=0.920) with the number of leaves and plant height. The correlation between the number of leaves and plant height with leaflets shows a very close relationship. If the number of leaves and plant height increase, the number of leaflets will also increase. That is because the plant height increases the number of leaves. According to Dewi et al. (2019), the number of leaflets is related to plant height because the taller the plant, the more leaves form on the Kailan plant (Brassica albogabra L.).

Table 7 shows that increasing the dose of dolomite showed a difference in the number of leaflets. Administration of dolomite at a dose of 7.5 tons, ha-1 resulted in a relatively better number of leaflets than other dolomite doses. Firdaus et al. (2022) state that the formation of the leaves and leaflets quantity is determined by the number and size of cells and is influenced by the nutrient content in the soil. According to Ilham et al. (2019), dolomite administration can increase nutrient availability in peat media due to increased soil reaction (pH).

Canopy Width

The results of the DNMRT further test at the 5% level of the canopy width can be seen in Table 8.

Table 8. Average canopy width of porang plants (cm) on peat media with bulbil size and dolomite dose treatment

Bulbil Size (g)	Dolomite Dosage (ton.ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	26.46 a	22.01 a	23.76 a	24.08 c
7.5-10.0	26.98 a	28.14 a	25.61 a	26.90 bc
10.0-12.5	29.78 a	30.72 a	31.89 a	30.81 b
12.5-15.0	32.26 a	35.36 a	44.13 a	37.25 a
Average	28.87 a	29.06 a	31.35 a	

Numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level.

Table 8 shows that the larger the bulbil size, the wider the canopy formed. That is related to plants from larger bulbil sizes that can carry out photosynthesis first to support better canopy growth of porang plants. The same thing was stated by Pranckietienė et al. (2020), which stated a positive correlation between tuber size and canopy width. The larger the tuber, the larger the canopy width. Panga et al. (2019) stated that the width of the porang canopy could reach 25-150 cm, depending on the age of the plant.

Table 8 shows that the administration of dolomite at a dose of 7.5 tons, ha-1 showed a larger canopy than the administration of other dolomite doses. It indicates that the improvement of peat soil's chemical and biological properties due to increasing the dose of dolomite can increase the growth of the canopy width of the porang plant.

According to Lakitan et al. (2018), leaf development and size are influenced by water availability and nutrients in the growing media. According to Moyne et al. (2022), water availability for porang plants is influenced by rainfall, and the number of dry months with a minimum rainfall of 75 mm is 1-7 months. Santosa dan Wirnas (2009) stated that frequent and regular irrigation would produce large leaves and a longer life span than in conditions of limited watering.

Number of Bulbil

The further test of DNMRT at the 5% level of the number of bulbil porang can be seen in Table 9.

Table 9. The average number of bulbils of porang plants on peat media with the treatment of bulbil size and dose of dolomite

Bulbil Size (g)	Dolomite Dosage (tons,ha-1)			Average
	2.5	5.0	7.5	
5.0-7.5	1.33 a	1.33 a	1.22 a	1.22 b
7.5-10	1.33 a	1.33 a	1.33 a	1.29 b
10-12.5	1.33 a	1.22 a	1.44 a	1.33 b
12.5-15.0	2.00 a	1.89 a	2.22 a	2.03 a
Average	1.49 a	1.44 a	1.55 a	

The numbers followed by the same lowercase letter were not significantly different according to the DNMRT test at the 5% level,

Table 9 shows that the larger the bulbil size, the greater the number of bulbils formed. The increase in the number of bulbils was related to the total plant height and canopy width. Based on the correlation table, the number of bulbils had a strong positive correlation (r= 0.606) and (r=0.634) with plant height and canopy width. The correlation between plant height and canopy width with the number of bulbils showed a close relationship. If plant height and canopy width parameters increased, the number of bulbils would also increase. Santosa et al. (2006) stated that porang has bulbil in the center of the branch and along the three main rachides. Bulbils are seen 1-1.5 months after planting, and the leaves are fully developed. The number of bulbils ranges from one to 50, depending on the size of the plant. According to Soedarjo et al. (2020),—Two-year-old plants usually have 16-20 bulbils. According to Santosa et al. (2019), the number of bulbils produced by porang plants at 23 WAP ranged from 2 to 4 bulbils. According to Sumarwoto (2004), bulbil weighs 1-23 g depending on the parent plant's age and the leaf's position.

4. CONCLUSIONS

Based on the results of the study, it can be concluded that:

1. Dolomite application can improve some chemical properties of peat soil.
2. The interaction between bulbil size and dolomite dose had no significant effect on all porang plant growth parameters.
3. The larger the bulbil size, the better the growth of the porang plant. The best size is 12.5-15.0 g.
4. The administration of dolomite only affected plant growth and height parameters at a dose of 7.5 ton.ha-1.

Suggestion

Based on the research results that have been carried out, it is recommended to plant porang on peat soil, using bulbil measuring 12.5-15.0 g with the addition of dolomite 7.5 ton.ha-1.

REFERENCE

Adnan, B. A. Bakar, A. Azis, E. Rosa, S. Fitri, S. Savitri, dan F. Fachruddin. 2021. The effects of phosphate and lime fertilizer on the growth and production of soybean plants in a former wetland. *IOP Conference Series: Earth and Environmental Science*. 667(1).

Ariffin, M. R., O. H. Ahmed, H. M. Saud, I. M. Isa, dan M. N. Khairudin. 2020. Nitrification potential of a tropical peat soil under oil palm (Elaeis guineensis jacq.) cultivation at different operational zones and soil depths. *Plant Archives*. 20(1): 3117–3122.

Ashagrie, T., D. Belew, dan A. Nebiyu. 2021. Influence of planting date and bulb size on yield and quality of onion (Allium cepa L.) seed production. *Cogent Food & Agriculture*. 7(1).

Bay, Y. P., N. Yulianti, S. Suparno, F. F.

Adji, Z. Damanik, dan S. Sustiyah. 2021. The Physical Properties Of Inland Peat In Natural Laboratory Of Peat Swamp Forest (LAHG) Sebangau, Central Kalimantan. *Jurnal Ilmu Lingkungan*. 15(2): 216.

BPS Kabupaten Madiun. 2021. *Kabupaten Madiun Dalam Angka Madiun Regency In Figures 2021*. Diambil dari https://madiunkab.bps.go.id/publication/2021/02/26/6d134479221f463c1b133952/kabupaten-madiun-dalam-angka-2021.html

Carvalho, R. da S. C., R. G. Bastos, dan C. F. Souza. 2018. Influence of the use of wastewater on nutrient absorption and production of lettuce grown in a hydroponic system. *Agricultural Water Management*. 203(March): 311–321.

Dariah, A., E. Maftuah, dan Maswar. 2013. Karakteristik Lahan Gambut. *Panduan Pengelolaan Berkelanjutan Lahan Gambut Terdegradasi*. 6(2): 16–29.

Dewi, C., T. Darsono, dan E. D. Pratiwi. 2019. Effectiveness Analysis of the Utilization Liquid Smoke Distilled from Organic Materials as an Alternative to Preservation Fish. 5(1): 10–16.

Firdaus, N. K., D. Pranowo, M. Herman, D. Listyati, dan A. Aunillah. 2022. Diversity of morphological characters and seed growth of (Amorphaluus muelleri) plants based on sources of planting materials and growth media. *IOP Conference Series: Earth and Environmental Science*. 974(1).

Girkin, N. T., B. L. Turner, N. Ostle, dan S. Sjögersten. 2018. Composition and concentration of root exudate analogues regulate greenhouse gas fluxes from tropical peat. *Soil Biology and Biochemistry*. 127: 280–285.

Gross, A., dan B. Glaser. 2021. Meta-analysis on how manure application changes to soil organic carbon storage. *Scientific Reports*. 11(1): 1–13.

Handayani, T., dan Yuzammi. 2016. Effect of growing media on seed germination and seedling growth of Porang (Amorphophallus muelleri Blume). In *Nusantara Bioscience* (Vol. 8, hal. 150–154).

Handayani, T., Yuzammi, dan J. T. Hadiah. 2020. Inflorescence morphology and development of Suweg (Amorphophallus paeoniifolius (Dennst.) Nicolson. *Biodiversitas*. 21(12): 5835–5844.

Hani, A., M. Siarudin, dan Y. Indrajaya. 2021. Revegetation of Peatlands in West Kalimantan With Superior Commodities. *The 5th SATREPS Conference*. (1): 14–18.

Hidayat, S. 2019. Short communication: The study of suweg (amorphophallus paeoniifolius) and other undergrowth species in teak plantation forest of temengeng, Blora, Indonesia. *Biodiversitas*. 20(1): 37–42.

Ilham, F., T. B. Prasetyo, dan S. Prima. 2019. Pengaruh Pemberian Dolomit Terhadap Beberapa Sifat Kimia Tanah Gambut dan Pertumbuhan serta Hasil Tanaman Bawang Merah (Allium ascalonicum L). *Jurnal Solum*. 16(1): 29.

Kementrian Pertanian. 2020. *Laporan Kinerja Laporan Kinerja*. Jakarta.

Kleber, M., dan J. Lehmann. 2019. Humic Substances Extracted by Alkali Are Invalid Proxies for the Dynamics and Functions of Organic Matter in Terrestrial and Aquatic Ecosystems. *Journal of Environmental Quality*. 48(2): 207–216.

Lakitan, B., S. Kadir, A. Wijaya, dan Susilawati. 2018. Tolerance of common bean (Phaseolus vulgaris L.) to different durations of simulated shallow water table condition. *Australian Journal of Crop Science*. 12(4): 661–668.

MOYNE, A.-L., J. WAITE-CUSIC, dan L. J. HARRIS. 2022. Water Application Method Influences Survival or Growth of Escherichia coli on Bulb Onions during Field Curing. *Journal*

of Food Protection. 85(6): 961–972.
Mubekti. 2011. Studi Pewilayahan Dalam Rangka Pengelolaan Lahan Gambut Berkelanjutan di Provinsi Riau. *Jurnal Sains dan Teknologi Indonesia*. 13(2): 88–94.
Mulyaningsih, T., A. Muspiah, E. Hidayati, Faturrahman, dan W. Hidayat. 2022. Tumpangsari Tanamaan Porang (Amorphophallus muelleri Blume) Dengan Pohon Ketimunan (Gyrinops versteegii) Di HKM Desa Pusuk Lestari, Kabupaten Lombok Barat. *Jurnal Abdi Insani*. 9(1): 92–107.
Mutaqin, A. Z., D. Kurniadie, J. Iskandar, M. Nurzaman, dan T. Husodo. 2021. Utilization and Cultivation of Suweg (Amorphophallus paeoniifolius (Dennst.) Nicolson in Areas around Ciremai Mount, Cimanuk Watershed Region. In *E3S Web of Conferences* (Vol. 249).
Noza, L., H. Yetti, dan m A. Khoiri. 2014. Pengaruh pemberian dolomit dan pupuk N, P, K terhadapt pertumbuhan dan produksi tanaman jagung (Zea mays saccharata Sturt.) di lahan gambut. *Jurnal Online Mahasiswa Fakultas Pertanian Universitas Riau*. 1(2): 1–11.
Pancaningtyas, S., T. I. Santoso, dan Sudarsianto. 2014. Studi Perkecambahan Benih Kakao Melalui Metode Perendaman. *Pelita Perkebunan*. 30(3): 190–197.
Panga, N. J., H. Hajar, R. Sjahril, dan R. Amin. 2019. Exploration and Identification of Amorphophallus spp in South Sulawesi. *Musamus Journal of Agrotechnology Research*. 1(2): 48–53.
Pranckietienė, I., R. Dromantienė, V. Smalstienė, D. Jodaugienė, V. Ilona, P. Aurelija, dan M. Marks. 2020. Effect of liquid amide nitrogen fertilizer with magnesium and sulphur on spring wheat chlorophyll content, accumulation of nitrogen, and yield*. *Journal of Elementology*. 25(1): 139–152.
Santosa, E., Y. Mine, A. P. Lontoh, N. Sugiyama, M. Sari, dan A. Kurniawati. 2019. Gibberellic acid application causes erratic flowering on young corms of Amorphophallus muelleri Blume (Araceae). *Horticulture Journal*. 88(1): 92–99.
Santosa, E., N. Sugiyama, M. Nakata, dan O. N. Lee. 2006. Growth and Corm Production of Amorphophallus in Indonesia at Different Shading Levels. *Jpn. J. Trop. Agr.* 50(2): 87–91.
Santosa, E., dan D. Wirnas. 2009. Teknik Perbanyakan Cepat Sumberdaya Genetik Iles-Iles (Quick Propagative Mass of Iles-Iles Genetic To Suport Sustainable. *Jurnal Ilmu Pertanian Indonesia*. 14(2): 91–96.
Septina, I., B. R. Sembiring, dan W. Adiwirman. 2020. Pengaruh Pemberian Dolomit Dan Npk Slow Release Fertilize r Terhadap Fisiologi Dan Pertumbuhan Jagung Manis (Zea Mays Saccharata Sturt) Pada Tanah Gambut. *Jurnal Agronomi Tanaman Tropika*. 2(1): 46–62.
Soedarjo, M., Y. Baliadi, dan F. Djufry. 2020. Growth Response of Porang (Amorphophallus muelleri Blume) Grown with Different Sizes of Bulbils on Saline Soil. *International Journal of Research Studies in Agricultural Sciences*. 6(4): 8–16.
Sumarwoto. 2004. Pengaruh Pemberian Kapur dan Ukuran Bibil Terhadap Pertumbuha Iles-Iles (Amorphophallus muelleri Blume) pada Tanah Ber-AL Tinggi. *Ilmu Pertanian2*. 11(2): 45–53.
Suntoro, S., H. Widijanto, Suryono, J. Syamsiyah, D. W. Afinda, N. R. Dimasyuri, dan V. Triyas. 2018. Effect of cow manure and dolomite on nutrient uptake and growth of corn (Zea mays l.). *Bulgarian Journal of Agricultural Science*. 24(6): 1020–1026.
Wahidah, B. F., dan N. Afiati. 2022. Ecological role and potential extinction of Amorphophallus

variabilis in Central Java , Indonesia. 23(4): 1765–1773.

Zaragoza-Puchol, D., J. E. Ortiz, A. A. Orden, M. Sanchez, J. Palermo, A. Tapia, … G. E. Feresin. 2021. Alkaloids Analysis of Habranthus cardenasianus (Amaryllidaceae), Anti-Cholinesterase Activity and Biomass Production by Propagation Strategies. *Molecules (Basel, Switzerland)*. 26(1): 1–18.