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Growth Response of Two Varieties Chrysanthemum (*Chrysanthemum sp*.) on Some Media Composition

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***Abstract*— Chrysanthemum is one type of ornamental plants flowers are very popular and have a relatively high economic value in Indonesia and have good marketing prospects. Requests cut flowers, and potted chrysanthemum plants are increasing from year to year, in line with improving standards of living. This study aims to obtain best medium composition on the growth of two varieties of chrysanthemum. The research was conducted in greenhouses West Sumatera Institute Assessment and Agricultural Technology in Sukarami Solok, from August 2015 to January 2016. The study is based on completely randomized design factorial of two factors with three replications. The first factor is the chrysanthemum varieties consisting of two levels (Limeron and Merahayani) and the second factor is the composition of the media that consists of four levels (soil: sand: husk fuel: 1: 1: 1, soil: sand: chicken manure: 1: 1: 1, soil: sand: coconut fibers 1: 1: 1 and soil: sand: municipal waste compost: 1: 1: 1. The results showed that growth of Merahayani varieties are better than Limeron varieties. The composition of medium affects the growth of chrysanthemum ornamental plant. The media composition soil: sand: municipal waste compost: 1: 1: 1 the best for the growth in the number of leaves, number of flowers, fresh weight and dry weight of plants. The composition of the soil media: sand: husk fuel: 1: 1: 1 the best for the growth of flower diameter and length of the longest root.**

***Keywords*— composition; media; chrysanthemum; growth; sand**

I. INTRODUCTION

Chrysanthemum is one of the important species of ornamental plants in Indonesia which has a high economic value, either in the form of cut flowers and pot plants. Their beautiful colorful flowering also makes good cut flower materials for vase or wreath making. Demand for the chrysanthemum is increasing, especially on religious holidays such as Christmas, New Year, Valentine day. Chrysanthemum has a beautiful flower so that it can make anyone who sees them will feel happy.

Demand for the chrysanthemum flower continuously increases along with the increase in population growth and changes in people's lifestyles. Chrysanthemum production increase is necessary to offset the demand.

Chrysanthemum is an herbaceous perennial flowering plant extensively grown all over the world for its beautiful, charming flowers with an excellent vase life [1]. The flower production is determined by its maintenance, especially in good cultivation. Chrysanthemum cultivation highly determines the success of flower formation [2].

Propagation of chrysanthemum can be done generatively and vegetatively. Vegetative propagation by cuttings of chrysanthemums was done by shoots and leaf cuttings. Singh and Cettri [3] report propagation of chrysanthemum under in vivo conditions through leaf cuttings increased the rate of regeneration of plants by 10-15 times as compared to the conventional method of propagation by terminal stem cuttings.

Growing media is another important factor in propagation studies because rooting performance depends on the type of medium used [4]. Selection and preparation of media is very important in determining the growth and quality of seedlings in the nursery.

The substrate plays an important role in plant growth, compactness and flowering of potted plants. Top soil is commonly used as a growing medium. Rojas *et al.* [5] report that the emergence across the five plant species was higher in the topsoil growth media compared to the other soil materials, most likely due to its larger available water content as a consequence of increased amounts of organic C. Top soils are generally unsatisfactory for the production of plants in containers because the soils do not provide the aeration, drainage, and water holding capacity required for plant growth [6].

Growth and development of potted chrysanthemum plants affected by the growing medium, the use of a suitable planting media and accordingly will provide better growth in plants. Andiani [7] states potted chrysanthemum growing media is media that is easy to get, the price is relatively low,

lightweight and must have the physical and chemical properties that can support root growth and nutrient uptake optimally. However, application of Gliocompost also could increase plant growth, production, and long freshness of cut flowers at room temperature [8].

Media planting pot commonly used soil, sand, coconut fiber, organic material, and compost. This media is generally not its own use but combined in order to better plant growth. Bhardwaj [9] states that the best papaya seedlings are growing on media poultry manure vermicomposting + + sand (1: 1; 1). According to Warnita et al. [10], the best medium for plant Amaryllis is soil, sand and cow manure (1: 1: 1, v / v). The yield of chrysanthemum produced in the trough system was higher than of the tray system due to the larger substrate volume [11].

Sand provides excellent support and gas exchange but has insufficient water and nutrient supplying capacity. Since water is held on the surfaces of particles, sand has a small water reserve [6].

Coconut fibers is an organic material that alternatives can be used as a medium for planting. Excess coir as growing medium more because its characteristics are able to bind and retain water with strong, according to the area, and contains the essential nutrient elements, such as Ca, Mg, K, N, and P [12].

Cocopeat + Sand + FYM +Vermicomposting (2:1:0.5:0.5v/v) was found to be the best potting media combination for the maximum number of flowers produced, and for the prolonged flowering duration in chrysanthemum cv. Sadbhavana as compared to other media [13]

Husk charcoal is the result of imperfect combustion of rice husk (paddy leather) with black color. In addition, husk also has carbon content fuels (C) high so as to make this into a planting medium conducive [12].

Cocopeat is gaining acceptance as a growing medium because of its excellent aeration, durability, lightness, and water holding characteristics [14]. Studies have shown several beneficial effects of municipal solid waste compost (MSWC) towards better crop management, as it may be considered as a source of different major nutrients and micronutrients to plants [15]. Adamcova and Vaverkopa [16] found a high percentage of germination capacity of white mustard seed (*Sinapis alba*) are grown in pots were treated with MSWC. The growth of tomato in hydroponic culture was enhanced when MSWVC and MSWC were used [17].
The objective of this study to investigate the effect of media composition on growth of two varieties of Chrysanthemum.

II. Material and Methods

The research was conducted in greenhouses Institute for Agricultural Technology in Sukarami Solok of West Sumatra, which lasts from August 2015 to January 2016. The study is based on completely randomized design factorial of two factors with three replications. The first factor is the chrysanthemum varieties consisting of two levels (Limeron and Merahayani) and the second factor is the composition of the media that consists of four levels (soil: sand: husk fuel: 1: 1: 1, soil: sand: chicken manure: 1: 1: 1, soil: sand: coconut fibers of 1: 1: 1 and soil: sand: municipal waste compost: 1: 1: 1.

All the planting medium used sterilized beforehand to avoid transmission of diseases in plants that carry over to the growing media. Sterilization is done by steaming at a temperature of approximately 100º C for 1 hour, especially for powder coconut fiber that the material is easily destroyed then need to be sterilized by soaking in a solution of fungicide Dithane – M 45 then dried, after which the planting medium was added to a pot that has been provided in accordance with the treatment. The next planting medium put in the pot cultivation.

Seeds form of chrysanthemum cuttings that have rooted shoots obtained from Ornamental Plants Research Center Cipanas, planted in appropriate media treatments by seed sank into a medium of getting to the root collar. Every pot in the planting of the seedlings. For potted chrysanthemum provision of additional irradiation for 4 weeks after planting by irradiating 16 hours / day were carried out at night on the clock 22:00 to 01:00 pm.

Maintenance in the form of watering, weeding and fertilizing. Fertilizer given at a dose of 3 g Urea, SP-36 1 g, 2 g KCl dissolved in 1 liter of water given during vegetative growth (1-7 WAP) with a volume of 50 ml per plant, super-green liquid fertilizer dose of 2 cc per liter of water by spraying onto the entire surface of the leaf at week 3, after it was done once a week. In the generative phase (8-12 WAP) given 1 g of urea, SP-36 4 g, 3 g KCl per liter of water with a volume of 100 ml per plant.

Pinching young apical growing point may serve to stimulate the growth of axillary buds for branching plants do 3 WAP. Type of chrysanthemum flower pot is then performed toping-type spray.

The observation parameter is plant height, leaf number, the number of florets flowers, flower diameter, the longest root length, fresh weight and dry weight of plants.

III. Results and Discussion

A. Plant Height

There is no interaction between the Chrysanthemum varieties and media composition. The results showed significant ($P < 0.05$) differences in plant growth highest amongst varieties treatments. The average plant's height of Merahayani varieties at 12 weeks after the planting was 52.89 cm while Limeron varieties 44.82 cm. The highest plants were obtained from Merahayani varieties (Table. 1). This is related to the genetic nature of such varieties.

The effect of selected growth media on root length of the two varieties of chrysanthemum is presented in Table 1. There is no significant differences among the growth media in terms of a number of leaves throughout the observation periods until 12 WAP. The composition of the media was no shown a significant effect on the growth of plant height both varieties of chrysanthemum. Both media compositions plus materials organic and not the results are almost the same. Soil organic matter (SOM) improves soil fertility by providing nutrients through mineralization, nutrient, and water holding capacity and acts as a habitat for soil micro-organisms [18].

TABLE I
PLANT HEIGHT TWO VARIETIES OF CHRYSANTHEMUM ON SOME MEDIA COMPOSITIONS

Media composition	Chrysanthemum varieties		Average
	Limeron	Merahayani	
	....cm....		
Soil: sand: husk fuel: 1: 1: 1	50.50	51.00	50.71
soil: sand: chicken manure: 1: 1: 1	43.10	52.80	47.95
soil: sand: coconut fibers 1: 1: 1	40.40	53.30	47.85
soil: sand: municipal waste compost: 1: 1: 1	45.30	54.50	49.90
Average	44.82 B	52.89 A	
CV / Coefficient of Variance = 20.88 %			

Note: means with the same capitalization letter within row not significantly different at $p < 0.05$ according to HSD test

Plant height that similar for all media compositions both existing supplemental organic matter or not. Lower densities and higher porosity of the sand and plus organic matter is very good for growing crops such as plant height higher. While plant height will affect the number of leaves and flowers.

In this experiment chrysanthemum given additional fertilizer N, P, and K to support growth and development. Supardjono [12] report the nutrients the plant becomes a very important factor to support the continuity of the process of plant metabolism so that growth and development are getting better. It is necessary to apply the fertilizer that contains all three macronutrients like N, P and K. Number of flowers, blooming period and flower size increased with the application of Nitrogen, Phosphorus, and Potash in combination [19].

B. Number of Leaves per Plant

In Table 2, there is no interaction between varieties and media composition to chrysanthemum growth. Both varieties of chrysanthemum showed significant differences in a number of leaves per plant. The number of leaves per plant merahayani varieties more than limeron varieties. It's due to the characteristics of each variety.

The number of chrysanthemum leaves is affected by the composition of the media. Media composition soil: sand: chicken manure: 1: 1: 1 and soil: sand: municipal waste compost: 1: 1: 1 gives the number of leaves more than any other media composition. This is related to the addition of organic matter will improve the physical, chemical, and biological soil. Ede *et al.* [20] state that sawdust plus poultry manure gave the highest number of leaves in the seedlings while the mixture of topsoil, poultry manure, and river sand gave the least.

On the other hand, media composition soil: sand: husk fuel: 1: 1: 1 and soil: sand: coconut fiber: 1: 1: 1 gives the less number of leaves. Allegedly on both the composition of this medium is its low N content so that it will affect the growing number of leaves

TABLE II
NUMBER OF LEAVES TWO VARIETIES OF CHRYSANTHEMUM ON SOME MEDIA COMPOSITIONS

Media composition	Chrysanthemum varieties		Average
	Limeron	Merahayani	
	...leaves...		
soil: sand: husk fuel: 1: 1: 1	43.00	46.65	44.83 b
soil: sand: chicken manure: 1: 1: 1	44.00	58.30	51.15 a
soil: sand: coconut fibers 1: 1: 1	34.30	38.00	36.15 b
soil: sand: municipal waste compost: 1: 1: 1	50.80	54.65	52.73 a
Average	43.03 B	49.40 A	
CV / Coefficient of Variance = 18.48 %			

Note: means with the same capitalization letter within row and small letters within column are not significantly different at $p < 0.05$ according to HSD test

Media with composition soil: sand: municipal waste compost: 1: 1: 1 can improve the physical, chemical, and biological soil. The soil is the medium commonly used. The sand media has a high porosity good for airbase and drainage, while municipal waste compost will be refining the physical properties of soil and contributes nutrients for plant growth.

The addition of organic material to the media will donate macro elements N, P, K which is very good for improving plant growth including the number of leaves. Organic materials improve the structure of roots and rhizosphere also provide additional nutrients for chrysanthemum especially N. Nitrogen is important for vegetative growth such as a leaf. The higher N concentration in media composition soil: sand: municipal solid waste compost: 1: 1: 1 has the ability to increase the number of cells in leaves, cell size and an overall leaf production. High

Application of N from animal manure in forage rice cultivation was significant improving growth characteristic of rice [21]. Fertilization of litter compost and cattle manure at the rate of 25 Mg ha-1 with additional nitrogen fertilizer produces higher green mustard fresh weight and number of leaves [22]. According to Ganesh [23], leaves serve as an index of measurement of vegetative growth and in determining the yield potential.

The increased plant height and vegetative buds so will increase the number of leaves. Leaves are organs of plants where the process of photosynthesis. When the leaf area

increased, assimilates to be even greater. Increased leaf area will cause a net assimilation rate increases so that the rate of growth also increased.

Warnita et al. [10] reported that leaf is an organ to perform photosynthesis to produce carbohydrates that can be used for growth and development. Increase the number of leaves will cause the amount of light, CO2, and water that enters through the stomata of the leaves so as to increase photosynthesis. With increasing photosynthesis scaling up of carbohydrates that much so it can be used to improve overall plant growth, including in the number of leaves

C. The Number of Florets Flower per Plant

There is no interaction between the varieties of chrysanthemums by medium composition on the number of florets flowers. Differences in the number of flowers associated with the genetic properties and characteristics of the plant. Besides growth in the number of florets flowers are also influenced by the previous vegetative growth.

The results showed that the number of florets flowers on media composition soil: sand: the chicken manure is 1: 1: 1 and soil: sand: municipal waste compost almost equal. This is caused by both these compositions have better physical properties and organic matter that can increase the growth of flowers.

The most number of florets flowers on media composition soil: sand: municipal waste compost: 1: 1: 1. While the least number of florets flowers in the media soil: sand: coconut fiber: 1: 1: 1. This is related to the composition of the soil media: sand: municipal waste compost: 1: 1: 1 which is porous, it can hold water and provide nutrients for the growth of flowers. Nowak and Strojny [24] who reported that the total porosity, bulk density, shrinkage water capacity and air capacity of the growing substrates had significant effects on the number and weight of fresh flowers in gerbera.

The low number of florets flowers on the composition of the soil media: sand: coconut fiber 1: 1: 1, because the coconut fiber is not able to provide nutrients enough for the growth of flowers. It is due to this composition has good physical properties and low organic matter content

Low contents of soil OC have been commonly associated with the loss of soil structure, which as a consequence, diminishes water holding capacity, increases bulk density, and accordingly produces soil compaction [25]. These conditions will affect the growth of roots that will affect the number of leaves and the number of florets flowers that are formed

TABLE III
THE NUMBER OF FLORETS FLOWERS TWO VARIETIES CHRYSANTHEMUM ON SOME COMPOSITION MEDIA

Media composition	Chrysanthemum varieties		Average
	Limeron	Merahayani	
	...buds...		
soil: sand: husk fuel: 1: 1: 1	14.65	21.90	18.28 ab
soil: sand: chicken manure: 1: 1: 1	11.20	29.30	20.25 a
soil: sand: coconut fibers 1: 1: 1	11.85	22.15	17.00 b
soil: sand: municipal waste compost: 1: 1: 1	17.35	32.85	25.10 a
Average	13.76 B	26.55 A	
CV / Coefficient of Variance = 23.87 %			

Note: means with the same capitalization letter within row and small letters within column are not significantly different at $p < 0.05$ according to HSD test

The least number of florets flowers in the media soil: sand: coconut fiber: 1: 1: 1 due coconut fiber not decomposed perfectly so that nutrients are available to plants is limited. Other variables associated with the media soil: sand: coconut fiber: 1: 1: 1 the number of leaves produced too little, so it will affect the number of florets flowers that are formed. Although coconut fiber able to bind and retain water with strong and contains essential nutrients, N, P, K, Ca, and Mg [12], but was not able to increase the number of flowers Chrysanthemum

D. Diameter of Flower

There is no interaction between the two varieties of chrysanthemums by the composition of the media in diameter flowers. Merahayani varieties flower diameter is almost the same size as limeron varieties. Conversely, medium composition significantly affects the chrysanthemum flower diameter.

Statistical analysis of the results showed that no significant difference the size of flower diameter on the composition of the soil media: sand: husk fuel: 1: 1: 1 and soil: sand: municipal waste compost: 1: 1: 1 and soil: sand: coconut fibers 1: 1: 1. The more flowers and has a diameter almost equal the more it will have a high value for potted chrysanthemum plants [7].

While the composition of the soil media: sand: chicken manure: 1: 1: 1 gives the size of the diameter of the flower smallest (4.35 cm). On the composition of the soil media: sand: husk fuel: 1: 1: 1 can increase the diameter of chrysanthemum (6.39 cm) because the medium is quite porous. Porous media associated with the development of roots, root easily penetrate the media thus better nutrient absorption would increase the diameter of the flower.

The more chrysanthemums and has a diameter which is almost as large will increasingly have a high value for potted chrysanthemum plants. this is because in its development the expected pot chrysanthemum flowers are brightly colored, growth is good, not disease, had a lot of interest and almost as large in diameter as well as fresh for a long time [7]

TABLE IV
THE DIAMETER OF FLOWER TWO VARIETIES CHRYSANTHEMUM ON SOME MEDIA COMPOSITIONS

Media composition	Chrysanthemum varieties		Average
	Limeron	Merahayani	
	.....cm.....		
soil: sand: husk fuel: 1: 1: 1	6.87	5.90	6.39 a
soil: sand: chicken manure: 1: 1: 1	4.36	4.33	4.35 b
soil: sand: coconut fibers 1: 1: 1	6.16	5.61	5.89 a
soil: sand: municipal waste compost: 1: 1: 1	6.30	5.78	6.04 a
Average	5.92 A	5.40 A	
CV / Coefficient of Variance = 17.97 %			

Note: means with the same capitalization letter within row and small letters within column are not significantly different at $p < 0.05$ according to HSD test

The diameter of flowers that form relating to the varieties and the vegetative growth before. According to Panj *et al*. [26], a significant relationship exists between different media combinations and flower growing yield and quality parameters. Niu and Cabrera [27] states that however, for ornamental plants, visual quality is more important than the growth rate. The expected pot chrysanthemum flowers are brightly colored, growth is good, not disease, had a heavy interest and is nearly as large in diameter and can last a long time [7].

E. The Longest Root Length

In Table 5. There is no interaction between the varieties and composition of the media to the length of the longest root. Merahayani varieties longest root length (19.70 cm) longer than the varieties Limeron (16.51). It is related to genetic and media where establishment the plant in media.

The composition of the soil media: sand: husk fuel: 1: 1: 1 produces the longest length (23.20 cm) is different from other treatments. The length of the shortest root on the composition of the soil media: sand: chicken manure: 1: 1: 1 is 13.25 cm. The composition of the soil media: sand: husk fuel, better physical properties, i.e. loose and porous so easily penetrated by roots. The nature of such media will facilitate the roots to grow and penetrate the media so that the roots become longer.

Husk fuel can easily absorb water, improves soil structure, has a carbon content (C) is high and can loosen the soil. Sand has properties that can boost the aeration and drainage system of the growing media

The roots are long and plunged into important to reach water and nutrients are much deeper on the ground. The physical properties of the soil, the texture and structure will affect the growth of roots. Popava [28], states that the elongation rate was significantly reduced the root may stop elongating even though the soil impedance does not exceed the root penetration pressure and promote the growth of other roots in more favorable microenvironments.

Media composition soil: sand: municipal solid waste compost: 1: 1: 1 helps in maintaining the appropriate texture of the growing media and prevents compaction, thereby the resulting in better root growth and shoot growth. This might also be due to the higher water holding capacity, aeration and available organic matter of this medium. According to Verma *et al.* [29] soil + sand + FYM + vermicomposting (2: 1: 0.5: 0.5 v / v / v) recorded the minimum plant spread (21:05 cm). The characters like plant height at the time of first flower bud appearance, the number of branches per plant and diameter of flower did not vary with the potting media significantly.

The media topsoil and river sand with NAA and IBA rooting hormones enhanced root formation of *Musaenda phillipica*. Ibironke and Victor [30] report the type of soil environment, whether homogeneously structured or layered, was found to influence root growth from the perspective of the root apex. So Root formation is very important; because it enables plant anchorage and seedling vigor.

Mechanical impedance and soil composition are major factors affecting root growth. By analyzing the root gravitropic response and tortuosity, we found that soil density and texture has a quantitative influence on root path formation. [26]. A good rooting media used will hasten root initiation Roots are able to colonize the soil volume because they can function for growth and survival, such as foraging for nutrients and water

TABLE V
THE LONGEST ROOT LENGTH TWO VARIETIES CHRYSANTHEMUM ON SOME MEDIA COMPOSITIONS

Media composition	Chrysanthemum varieties		Average
	Limeron	Merahayani	
	cm		
soil: sand: chaff fuel: 1: 1: 1	19.93	26.46	23.20 a
soil: sand: chicken manure: 1: 1: 1	11.16	15.34	13.25 b
soil: sand: coconut fibers 1: 1: 1	17.15	17.94	17.55 a
soil: sand: municipal waste compost: 1: 1: 1	17.78	19.07	18.43 a
Average	16.51 B	19.70 A	
CV / Coefficient of Variance = 20.70 %			

Note: means with the same capitalization letter within row and small letters within column are not significantly different at $p < 0.05$ according to HSD test

F. The Plant Fresh Weight

There is no interaction between the varieties and composition of the media on plant fresh weight (Table 6). The highest plant fresh weight obtained on the Merahayani varieties and the lowest on Limeron varieties. The average fresh weight of Merahayani varieties 10:10 g while the varieties Limeron 7.67 g. This is related to the vegetative growth of plants such as plant height, the number leaves, the number of flower and root length.

Media composition is best to plant fresh weight is soil: sand: municipal waste compost: 1: 1: 1. In addition to this physical medium composition porous medium can hold water and there are also additional nutrients from municipal waste. Good vegetative growth will increase the fresh weight of a plant. Furthermore, Khan *et al.*, [31] reported that the planting medium must be porous and well drained to permit free roots penetration, secure anchorage, and have sufficient nutrients to support crop growth.

Media composition of soil: sand: municipal waste compost: 1: 1: 1 the best because in addition can improve the physical properties of soils also can contribute nutrients for plant growth and development.

The lower the number of leaves, the leaf area obtained decreased as a result of photosynthesis produced little so that the fresh weight of the plant will be low. In contrast the number of leaves that many naturally growing broad leaf photosynthesis generated a lot of the fresh weight of the plants to be higher.

Solid waste compost content nutrition N, P and K. Phosphorus and potash along with nitrogen resulted in a maximum increase in nutrient uptake due to increased photosynthesis, resulting in an increased leaf area. Hence application of all three nutrients resulted in larger leaf area.

TABLE VI
THE FRESH WEIGHT TWO VARIETIES CHRYSANTHEMUM ON SOME MEDIA COMPOSITIONS

Media composition	**Chrysanthemum varieties**		**Average**
	Limeron	**Merahayani**	
	.....g.....		
soil: sand: chaff fuel: 1: 1: 1	7.96	10.38	9.17 ab
soil: sand: chicken manure: 1: 1: 1	7.40	10.69	9.05 ab
soil: sand: coconut fibers 1: 1: 1	5.42	8.22	6.82 b
soil: sand: municipal waste compost: 1: 1: 1	9.91	12.72	11.32 a
Average	7.67 B	10.50 A	
CV / Coefficient of Variance = 20.20 %			

Note: means with the same capitalization letter within row and small letters within column are not significantly different at $p < 0.05$ according to HSD test

G. The Plant Dry Weight

Varieties and composition of the media do not interact to plant dry weight (Table 7). The highest plant dry weight obtained at Merahayani varieties and the lowest at Limeron varieties.

The results showed that the composition of the media is best to plant dry weight gain is soil: sand: municipal waste compost: 1: 1: 1 and the lowest soil: sand: coconut fiber: 1: 1: 1. Media was mixed with municipal solid waste compost have better physical properties such as porous, high water holding capacity, also can increase the pH media. In addition media, municipal waste will contribute nutrients for plant growth that will improve plant dry weight. Olosunde et al. [32] reported that an effective growth media should provide anchorage to the plant; hold sufficient available nutrients; be porous and well drained; relatively low in soluble salts; standardized and uniform; free pests and pathogens; biologically and chemically stable.

TABLE VII
THE DRY WEIGHT TWO VARIETIES CHRYSANTHEMUM ON SOME MEDIA COMPOSITIONS

Media composition	**Chrysanthemum varieties**		**Average**
	Limeron	**Merahayani**	
	g		
soil: sand: chaff fuel: 1: 1: 1	1.62	2.37	2.00 a
soil: sand: chicken manure: 1: 1: 1	1.41	2.19	1.78 ab
soil: sand: coconut fibers 1: 1: 1	0.97	1.90	1.44 b
soil: sand: municipal waste compost: 1: 1: 1	1.85	3.16	2.50 a
Average	1.46 B	2.40 A	
CV / Coefficient of Variance = 23.91 %			

Note: means with the same capitalization letter within row and small letters within column are not significantly different at $p < 0.05$ according to HSD test

The physical properties of aeration and water holding capacity are probably the most important factors while, among the chemical characteristics, nutritional status, and salinity level have a crucial role in plant development [33]. Meanwhile, 72% of the compost mixed with topsoil could produce the best planting material with respect to the high DMW production, oil palm seedlings growth [34].

IV. CONCLUSION

There is no interaction between the varieties and composition of the media on the growth and flowering of chrysanthemum. Plant height, the number of leaves, the number of flowers, the longest root length, plant fresh weight and dry weight of plant varieties Merahayani better than varieties Limeron. The media composition soil: sand: municipal waste compost: 1: 1: 1 the best for the growth in the number of leaves, number of flowers, fresh weight and dry weight of plants. The composition of the soil media: sand: husk fuel: 1: 1: 1 the best for the growth of flower diameter and length of the longest root.

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