ISBN : 978-623-331-387-2

Flowering Response of Chrysanthemum (*Chrysanthemum indicum* L.) from Different Cuttings Material and Doses Variation of NPK Mutiara Fertilizer Application

Willem[1*], **Sri Wahyu Ningsih**[1]
[1]Departement of Agrotechnology, Borneo Tarakan University, Indonesia
*email : willem@borneo.ac.id

ABSTRACT

Chrysanthemum is an ornamental plant originating from the mainland of China in the form of shrubs and has a variety of colors and species. Chrysanthemum production in Indonesia began to increase from year to year. This increase in production is also offset by an increase in problems, especially in the field of cultivation. This study aims to determine the effect of the origin of planting material (chrysanthemum seeds and dose of NPK fertilizer on chrysanthemum flowering). This study consisted of two factors, the first factor was the origin of the planting material (tillers and branches), and the second factor was the dose of NPK Mutiara fertilizer (2 grams/plant, 4 grams/plant, and 6 grams/plant). The results of the research, testing of tiller cuttings produced more branches that produced flowers, while branch cuttings produced flowers more quickly. The interaction of different tiller cuttings, branches and doses of NPK Mutiara had a significant effect on the observation of plant height in P2N3, the number of leaves in P2N3, the number of tillers in P2N2, the number of branches in P2N3, the number of branches that produced P2N2 flowers, and the number of flowers on the main stem of P2N3. However, from tiller and branch cuttings, the more influential dose of NPK Mutiara fertilizer or better growth was found in the fertilizer dose treatment of 6 grams (P2N3).

Keywords:

Tillers, dose, NPK fertilizer, chrysanthemum, cuttings

INTRODUCTION

Chrysanthemum is a shrub-shaped ornamental plant that has a variety of colors and varieties. It is also known as the golden flower. This plant is one of the important plants in the ornamental plant group. It is because besides being an ornamental plant, chrysanthemum has the potential as a mosquito repellent and pollutant absorber. The production of chrysanthemum plants in Indonesia is starting to increase from year to year. It shows that Indonesia has potential for the chrysanthemum business. Chrysanthemum exports currently have been carried out to several countries including Japan, Saudi Arabia, Kuwait, Pakistan and the United Arab Emirates [1].

Chrysanthemum productivity generally in Indonesia is quite fluctuative, but it tends to increase during the period of 2000-2013. The average productivity increase is around 38.35% every year. The fluctuating productivity was due to an increase in the chrysanthemum harvest area in Indonesia which was very high in 2007 from +/- 194 ha to +/- 428 ha. However, the production is extremely low. it is only increased by 5.12%. The low productivity can be caused by several things, one of which is the low quality of the chrysanthemum seeds used [2]. In addition, there is another problem in the cultivation of chrysanthemum plants. The continuous availability of chrysanthemum flowers is needed to fullfill consumer demand so chrysanthemum seeds are needed in large quantities. Therefore, to overcome these problems, farmer import most the seeds from abroad, eq Netherlands, Germany, the United States and Japan. Nevertheless, it causes production costs to be more expensive [3]. Dependence on imported seeds and the unavailability of needed seeds on time, quantity and variety are often obstacles in efforts to increase crop productivity on a traditional farmer scale [4].

Flower quality had assumed to be influenced by several factors, one of which is the cutting material. Branch cuttings are part of the branch that grows on the stem of the plant. However, propagation using branch cuttings is considered less effective because it takes a quite long time for the cuttings to form roots. Another effort to obtain high quality cut flower production is through the proper nutrient application. Therefore, to achieve the best flower quality, it needs to be balanced with the proper application of NPK Mutiara fertilizer [5]. This study was accordingly conducted a test of seed cuttings and different doses of NPK pearls on the formation of Chrysanthemum (*Chrysanthimum indicum* L.) flowers, especially in Tarakan City, North Kalimantan, in order to increase the availability of chrysanthemum products among the community.

METHOD

This research was conducted from April to June 2021, in the research area of the Agriculture Faculty, Borneo Tarakan University. The materials were used i.e., chrysanthemum plant cuttings from tillers and branches, chicken manure, NPK Mutiara fertilizer, and polybags. This study used a Randomized Block Design with 2 factors. The first factor is the seeds cuttings test with 2 levels. It consists of, P1: chrysanthemum tiller cuttings and P2: chrysanthemum branch cuttings. The second factor is the dose of NPK Mutiara with 4 levels. The doses include, N0: control + polybag + 5 kg of soil; N1: 2 g + polybag + 5 kg of soil; N2: 4 g + polybag + 5 kg of soil; N3: 6 g + polybag + 5 kg of soil. It used factorial experiments with different treatment combinations. Each treatment was repeated 5 times so that there were 40 experimental units (Table 1).

Field preparation was conducted loosening the soil. Subsequently, the soil that had been loosened was dried on a container or tarpaulin for one week. after drying process, then it was strained. Chicken manure was applied for one week before planting. Chicken manure was applied as basic fertilizer as much as 3 grams. Selection of seeds obtained from the tiller and branches of chrysanthemum which had good quality for cuttings. The category of good quality seeds is characterized by maximum flower formation, high plant productivity and not being attacked by pests and diseases. Seedlings of chrysanthemum cuttings of tiller and branches were planted in polybags measuring 13x16 cm. After the roots and leaves were formed (± 2 strands) on the seedlings and branch cuttings or 14 DAP, the seedlings were transferred using polybags measuring 30x40 cm. Pearl NPK fertilizer was applied to plants that were 30 DAPS with treatment doses, namely: N0 = 0 g, N1 = 2 g, N2 = 4 g and N3 = 6 g. The application of NPK Mutiara Fertilizer was carried out in the morning with a predetermined concentration and the application of NPK Mutiara Fertilizer was carried out for 1 application by giving it directly to the plant by placing it on the edge of the plant in a circular shape or some distance from the plant roots.

Vegetative parameters were observed i.e., number of leaves, plant height, number of tillers, and number of branches. The generative parameters were observed i.e., the number of productive branches and the number of flowers on the main stem. Parameters were observed every 2 weeks after the treatment application. Observation of plant height, number of tillers, and number of leaves was carried out 6 times at 2 WAP, 4 WAP, 6 WAP, 8 WAP, 10 WAP, and 12 WAP. Meanwhile, the observation of the number of branches, the number of productive branches, and the number of flowers on the main stem was carried out once. The data that had been obtained was analyzed using ANOVA (Analysis of Variance) then it was continued with the Duncan's Multiple Range Test (DMRT) test 5%.

Table 1. The Combination of Randomized Block Design treatment with two factors

Repetition	N0	N1	N2	N3
P1	N0P1	N1P1	N2P1	N3P1
P2	N0P2	N1P2	N2P2	N3P2

Note: N0 = Control N1 = 2 g N2 = 4 g N3 = 6 g; P1 = Tiller cuttings P2 = Branch cuttings

RESULT AND DISCUSSION

There was no significantly different at 4 WAP and 8 WAP, but significantly different at 6,10 and 12 WAP. While the P treatment did not experience a significant difference or did not interact with fertilizer application on tiller cuttings, and branches (Table 2).

Table 2. Single Factor of Fertilizer Dose Application Towards Plant Height.

	Plant Height				
Treatments N	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
N0	11.90 a	13.80 ab	17.20 a	19.90 a	21.20 a
N1	11.00 a	13.00 a	17.40 a	19.90 a	22.20 a
N2	11.40 a	15.20 ab	18.70 a	21.30 a	23.50 a
N3	11.60 a	17.10 b	21.30 a	29.10 b	34.70 b
	Plant Height				
Treatments P	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
P1	12.9 a	15.75 a	18.85 a	22.6 a	25.6 a
P2	10.05 a	13.8 a	18.45 a	22.5 a	25.7 a

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

Table 3. DMRT Test Results on Plant Height

Treatments	Plant Height				
	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
P1N0	14.40 a	16.80 a	20.20 a	22.80 a	24.80 a
P1N1	12.60 a	14.40 a	19.40 a	22.20 a	24.80 a
P1N2	13.60 a	17.60 a	20.40 a	23.20 a	25.20 a
P1N3	11.00 a	14.20 a	15.40 a	22.20 a	27.60 a
P2N0	9.40 a	10.80 a	14.20 a	17.00 a	17.60 a
P2N1	9.40 a	11.60 a	15.40 a	17.60 a	19.60 a
P2N2	9.20 a	12.80 a	17.00 a	19.40 a	23.80 a
P2N3	12.20 a	20.00 b	27.20 b	36.00 b	41.80 b

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, P1 = tillers cuttings P2 = branch cuttings, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

Tabel 4. Single Factor of Fertilizer Dose Application Towards Number of Tillers

Treatment N	Number of Tillers					
	2 WAP	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
N0	2.70 a	2.40 a	2.70 a	2.60 a	2.60 a	2.80 a
N1	3.40 a	3.50 b	3.50 ab	3.80 b	3.90 b	4.00 b
N2	4.60 b	3.80 b	4.30 b	4.20 b	4.10 b	4.20 bc
N3	4.40 b	4.50 b	5.30 c	5.40 c	5.30 c	5.00 c
Treatments P	**2 WAP**	**4 WAP**	**6 WAP**	**8 WAP**	**10 WAP**	**12 WAP**
P1	3.45 a	3.15 a	3.85 a	3.85 a	3.6 a	3.95 a
P2	4.1 a	3.95 a	4.05 a	4.15 a	4.35 a	4.05 a

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

The best result was showed at N2 of 2 WAP, N3 of 4 WAP, N3 of 6 WAP, N3 of 8 WAP, N3 of 10 WAP and N3 of 12 WAP (Table 4). Subsequently it was followed by N2, N1 and N0. However, it was significantly different at 2,4,6,8,10 and 12 WAP, while the P treatment did not show the significant difference or did not interact with fertilizer application on tiller cuttings and branches.

Tabel 5. DMRT Test Results on Number of Tillers

Treatments	Number of Tillers					
	2 WAP	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
P1NO	2.20 a	2.00 a	2.80 a	2.00 a	1.80 a	2.80 a
P1N1	3.20 ab	3.20 ab	4.20 ab	3.60 b	3.60 b	4.20 ab
P1N2	4.60 c	3.40 ab	4.20 ab	4.60 bc	4.00 bc	4.20 ab
P1N3	3.80 bc	4.00 b	4.60 b	5.20 c	5.00 c	4.60 b
P2N0	3.20 a	2.80 a	3.00 a	3.20 a	3.40 a	2.80 a
P2N1	3.60 ab	3.80 ab	3.40 a	3.80 a	4.20 ab	3.80 ab
P2N2	4.60 ab	4.20 b	4.20 ab	4.00 a	4.20 ab	4.20 ab
P2N3	5.00 b	5.00 b	5.60 b	5.60 b	5.60 b	5.40 b

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, P1 = tillers cuttings P2 = branch cuttings, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

Table 6. Single Factor of Fertilizer Dose Application Towards Number of Leaves

Treatments N	Number of Leaves					
	2 WAP	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
N0	8.50 a	9.60 a	11.90 a	13.70 a	11.70 a	15.40 a
N1	7.80 a	9.70 a	13.10 a	14.00 a	13.00 ab	15.27 a
N2	7.60 a	10.11 a	12.50 a	17.20 a	17.30 bc	19.77 ab
N3	8.50 a	10.45 a	12.80 a	16.30 a	20.30 c	25.00 b
Treatments	**2 WAP**	**4 WAP**	**6 WAP**	**8 WAP**	**10 WAP**	**12 WAP**
P1	8.85 a	10.6 a	13.25 a	16.35 a	16.5 a	17.85 a
P2	7.25 a	9.35 a	11.9 a	14.25 a	14.65 a	19.65 a

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

The best results were showed at N3 of 2 WAP, N3 of 4 WAP, N3 of 6 WAP, N2 of 8 WAP, N3 of 10 WAP, and N3 of 12 WAP. Subsequently it was followed by N2, N1 and N0. However, it was not significantly different at 2 MST, 4 MST, 6 MST, and 8 MST. The result was significantly different at 10 and 12 MST. Whereas the P treatment did not show significant differences or did not interact with fertilizer application on tiller cuttings, and branches (Table 6).

Tabel 7. DMRT Test Results on Number of Leaves

Treatments	Number of Leaves					
	2 WAP	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
P1NO	9.20 a	10.00 a	11.80 a	14.40 a	12.40 a	15.20 a
P1N1	8.80 a	10.20 a	14.60 a	15.20 ab	14.80 a	14.80 a
P1N2	8.20 a	11.60 a	15.00 a	20.40 b	20.40 a	20.00 a
P1N3	9.20 a	10.60 a	11.60 a	15.40 ab	18.40 a	21.40 a
P2N0	7.80 a	9.20 a	12.00 a	13.00 a	11.00 a	15.60 a
P2N1	8.20 a	9.20 a	11.60 a	12.80 a	11.20 a	15.60 a
P2N2	7.00 a	8.40 a	10.00 a	14.00 a	14.20 a	18.80 a
P2N3	7.40 a	10.60 a	14.00 a	17.20 a	22.20 b	28.60 b

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, P1 = tillers cuttings P2 = branch cuttings, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

Tabel 8. Single Factor of Fertilizer Dose Application Towards Number of Branch

Treatments	Number of Branch
N0	4.10 a
N1	4.90 a
N2	9.10 b
N3	10.50 b
Treatments	Number of Branch
P1	5.55 a
P2	8.75 a

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

The fertilizer treatment that showed the best results was at N3 then it followed by N2, N1 and N0. Meanwhile, the P treatment did not show significant differences or did not interact with fertilizer application on tiller cuttings, and branches (Table 8).

The fertilizer treatment that showed the best results was at N2 then it was followed by N3, N1 and N0. Meanwhile, the P treatment did not show significant differences or did not interact with fertilizer application on tiller cuttings, and branches (Table 10).

Table 9. DMRT Test Results on Number of Branch

Treatments	Number of Branch
P1N0	3.20 a
P1N1	5.00 a
P1N2	6.80 a
P1N3	7.20 a
P2N0	5.00 a
P2N1	4.80 a
P2N2	11.40 b
P2N3	13.80 b

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, P1 = tillers cuttings P2 = branch cuttings, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

Table 10. Single Factor of Fertilizer Dose Application Towards Number of Productive Branch

Treatments	Towards Number of Productive Branch
N0	6.00 a
N1	8.20 a
N2	15.10 b
N3	13.50 b
Treatment	Towards Number of Productive Branch
P1	7.4 a
P2	14 a

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

Based on the results, it was known that the effect of NPK Mutiara fertilizer treatment does not have a significant effect on the vegetative growth e.g., plant height, number of leaves and number of tillers, in period of 2-12 WAP. However, it had the best result on plant height, i.e., in P2 treatment (branch cuttings). It was also followed by P1 (tillers cuttings). In terms of the number of tillers, the best treatment was P2 (branch cuttings) and P1 (tillers) at 2 and 12 WAP. In the number of leaf parameters, the best treatment was P2 (branch cuttings) and P1 (tillers) at 10 and 12 WAP.

It indicated that the increase in plant height of a plant had assumed caused by the occurrence of leaf division and cell elongation which is stimulated by nutrient application. As a result, metabolic activity in plant tissues produces organic material that can be utilized to increase plant height. However, the low content of organic matter will result in a lack of soil fertility conditions that have effect on reduced vegetative growth and decreased crop yields. Therefore, efforts need to be made to add more organic matter into the soil so that the productivity of the soil increases, one of these efforts is to add organic matter in the form of balanced organic and inorganic fertilizers [6]. Sianturi [6] also stated that plants will grow well if sufficient nutrients are available for plants. Provision of nutrition is one way to fullfill nutrient needs and this goal will only be achieved if the proper of concentration in providing nutrients is conducted.

Iskandar [7], explained that the right application of organic matter can add essential nutrients. It can also increase the availability of nutrients in the soil for plants, especially N, whose main function is for plant vegetative development such as leaf formation and plant height. The higher the number of leaves and the plant height, the higher the leaf area formed for optimizing photosynthesis and the number of branches and stems that support the laying of leaves and fruit. The stunted growth of leaves and plant height will not be able to absorb sunlight optimally for photosynthesis.

According to Alavan et al [8], each plant also has different genetic, morphological, and physiological properties. Based on this statement, it can be seen that the nutrient requirements for increasing the number of tillers of each plant are different. In addition, Pratiwi [9] also said that in addition to the effect of providing nutrients N, P and K, plants are also influenced by the activity of microorganisms in the soil and the adequacy factor of the light intensity received.

Wibawa and Sugandi [10] also explained that the number of tillers plays an important role in determining the productivity of chrysanthemum plants. Plants with the ability to form a high number of tillers are predicted to have high productivity compared to plants with a small number of tillers. In addition, the N element in the planting medium was able to stimulate the growth of the number of tillers in chrysanthemum plants.

Table 11. DMRT Test Results on Number of Productive Branch

Treatments	Number of Productive Branch
P1N0	4.80 a
P1N1	7.00 a
P1N2	8.60 a
P1N3	9.20 a
P2N0	7.20 a
P2N1	9.40 a
P2N2	21.60 b
P2N3	17.80 b

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, P1 = tillers cuttings P2 = branch cuttings, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

Tabel 12. Single Factor of Fertilizer Dose Application Towards Number of Flower on Main Stem

Treatments	Number of Flower on Main Stem
N0	4.40 a
N1	6.80 b
N2	8.30 bc
N3	8.80 c
Treatment	Number of Flower on Main Stem
P1	5.75 a
P2	8.4 a

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g.

The fertilizer treatment that showed the best results was at N3 then it was followed by N2, N1 and N0. Meanwhile, the P treatment did not show significant differences or did not interact with fertilizer application on tiller cuttings, and branches (Table 12).

Table 13. DMRT Test Results on Number of Flower on Main Stem

Treatments	Number of Flower on Main Stem
P1N0	3.40 a
P1N1	6.00 b
P1N2	7.00 b
P1N3	6.60 b
P2N0	5.40 a
P2N1	7.60 a
P2N2	9.60 bc
P2N3	11.00 c

Note: Numbers followed by the same letter show results that are not significantly different on DMRT 5%, P1 = tillers cuttings P2 = branch cuttings, N0= Control, N1= 2 g, N2= 4 g and N3= 6 g

Based on the results, the application of giving NPK Mutiara did not significantly affect several production parameter variables, namely the number of branches, the number of branches that produced flowers, and the number of flowers on the main stem. It can be seen that each treatment was good from N0, N1, N2 and N3. did not increase or was not significantly different.

It can be influenced by the genetic factors so that there was no significant effect on the treatment given and environmental factors e.g., rainfall and sunlight intensity towards the chrysanthemum plants. The low availability of nutrients is not sufficient for plant needs where organic fertilizers are generally very slow in providing nutrients to plants because it requires a long process to remodel organic matter to become compounds that can be absorbed by plants properly [11]. This is also supported by the state of the surrounding environment. Not all flowers that are formed can grow on branches. From a physiological point of view, it is not possible for cuttings from the tip to have young cells and have relatively lower carbohydrate reserves which affect the level of stem hardness, thus affecting the percentage of success in growing from cuttings [11].

Putra, et al., [12] stated that plant growth and yield would be better if all the nutrients contained in the planting medium and NPK Mutiara fertilizer needed by plants were in sufficient condition, while the parameters of the number of branches that produced flowers had an effect on real. According to Evita [13] the availability of sufficient nutrients allows the photosynthesis process to run optimally and produce more food reserves in the tissue, it will allow the formation of a lot of flowers or fruit. This is causes plant growth in the vegetative phase, especially in the number of branches that produce flowers and the number of flowers on the main stem to be optimal.

According to Sudaryanto [2], the more the number of flowers in each stem, the higher the stem indirectly so that it is often categorized as good quality flowers. This is supported by research by Noviawanti [14] which stated that increasing the length of irradiation can increase the number of flowers formed. In the dark phase the photosynthate results are more focused on flower formation. The longer the dark phase obtained by plants, the more photosynthate products that are translocated at the initiation of flowering or flower formation. differences between varieties resulted in different growth appearances, both in Lollipop and Bakardi varieties due to differences in the speed of division, propagation, and cell enlargement. These conditions indicate that there are differences in the genetic factors possessed by each variety and their ability to adapt to the environment.

CONCLUSION

The conclusions of this research are:

1. In a single treatment, P2N3 has the potential to stimulate plant height growth, increase the number of leaves, increase the number of branches, and stimulate flowering on the main stem. P2N2 treatment has the potential to increase the number of tillers and increase the number of productive branches. However, the best combination treatment of tillers and branch cuttings with a dose of NPK Mutiara fertilizer was found in the P2N3 treatment, i.e., 6 g.
2. Tiller cuttings have the potential to produce more productive branches, while branch cuttings have the potential to form flowers more quickly.

ACKNOWLEDGMENTS

We thank to the staff of laboratory and landscape coordinator of the Agrotechnology Department, Agriculture Faculty, Borneo Tarakan University, Indonesia.

REFERENCES

[1] Rahayu, S.M. & Hasrat E. P. 2013. Penambahan Bahan Organik Pada media Pertumbuhan Krisan (*Dendrathema grandiflora* Tr.) Secara In Vitro. Bul. Agrohorti, 1(4), 94-100.

[2] Sudaryanto, B. 2010. Budidaya Tanaman Krisan. Balai Pengkajian Teknologi Pertanian Yogyakarta.18-20.

[3] Istianigrum, Putri, Damanhuri. Swoetopo, & Lita. 2013. Pengaruh Generasi Benih Terhadap Pertumbuhan dan Perkembangan Krisan (Chrysanthemum) Varietas Rhino. Jurnal Produksi Tanaman, 1(3).

[4] Kementerian Pertanian. 2014. Ourlook Komoditi Krisan. Jakarta: Pusat Data dan Sistem Informasi Pertanian Sekretariat

ISBN : 978-623-331-387-2
Managed By: Faculty Of Agriculture, University Of Borneo Tarakan

Jederal-Kementerian Pertanian, 2014. accessed on September 1st 2021.

[5] Kusumadewi, S. 2017. Budi Daya Tanaman Krisan. Jakarta: CV. Sinar cemerlang Abadi. pp. 5-45.

[6] Sianturi, D. 2019. Pengaruh Pemberian Pupuk Kascing dan NPK Mutiara (16:16:16) Terhadap Pertumbuhan Serta Produksi Terung Gelatik. Pp 20

[7] Iskandar, D. 2003. Pengaruh dosis pupuk N, P, K terhadap pertumbuhan dan produksi jagung manis di lahan kering. Prosiding seminar teknologi untuk negri 2003, pp 35.

[8] Alavan, A., Hayati, R. & Hayati, E. 2015. Pengaruh Pemupukan Terhadap Pertumbuhan Beberapa Varietas Padi Gogo. J. Floratek, 64

[9] Pratiwi, S.H. 2016. Pertumbuhan dan Hasil Padi (Oryza Sativa L.) Sawah Pada Berbagai Metode Tanam Dengan Pemberian Pupuk Organik. Gontor AGROTECH Science Journal, 2 (2), 6.

[10] Wibawa, W. & Sugandi, D. 2015. Pola Pembentukan Anakan Padi Dari Berbagai Varietas Dan Jumlah Bibit Per Lubang Pada Lahan Suboptimal Di Provinsi Bengkulu. 224.

[11] Sukarman, H., Moko & Rusmin, D. 2002. Via bilitas Jenis Entres Jambu Mete (Anacardium occidental L). Jurnal Ilmiah Pertanian, 8(1), 78-89

[12] Putra, F. Indriyanto and.Riniarti M 2014. Keberhasilan Hidup Stek Pucuk Jabon (Anthocephalus cadamba) dengan Pemberian Beberapa Konsentrasi Rootone-F.Jurnal Sylva Lestari.Vol.2 No.2.Hal.33-40.

[13] Evita. (2009). Pengaruh Bebagai Pupuk Organik Cair Terhadap Pertumbuhan dan Hasil Tanaman Kacang buncis. Agronomi, 13(1), 63

[14] Noviawanti, N. 2014. Periode pembungaan pohon dan aplikasinya dalam tanaman. [Skripsi]. Fakultas Pertanian IPB. [Indonesia].