

Response growth and yield of okra (*Abelmoschus esculentus* L.) to giving dosage levels of chicken manure and variation of plants spacing

by Kartina Am

Submission date: 01-May-2023 05:57AM (UTC+0700)

Submission ID: 2080148924

File name: Response_growth_and_yield_of_okra_Abelmoschus_esculentus_L.pdf (961.9K)

Word count: 5611

Character count: 23071

PAPER · OPEN ACCESS

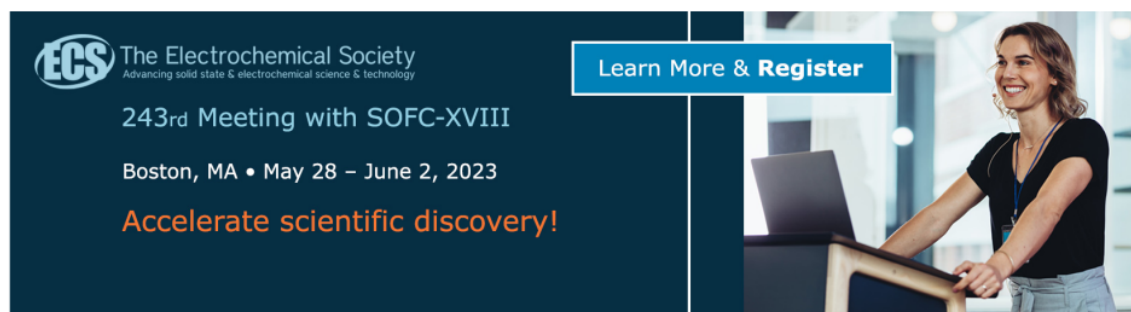
Response growth and yield of okra (*Abelmoschus esculentus* L.) to giving dosage levels of chicken manure and variation of plants spacing

To cite this article: A M Kartina et al 2019 IOP Conf. Ser.: Earth Environ. Sci. **383** 012028

View the [article online](#) for updates and enhancements.

You may also like

- [Effect of Organic and Inorganic Fertilizers on Growth and Yield of Hybrid Cucumber *Cucumis sativus* L. Grown under Unheated Plastic House](#)
Hussein Jawad Muharram Al-Bayati
- [Improvement of soybean yields using organic fertilizer enriched with microbes under dry land condition of Banten Province](#)
S Yuniarti, T Mulyaqin, M C Hadiatry et al.
- [Chicken manure and biofertilizer for increasing growth and yield of potato \(*Solanum tuberosum* L.\) of Granola varieties](#)
E Kantikowati, Karya, Y Yusdian et al.



The advertisement features a dark blue background on the left and a photograph of a woman at a laptop on the right. The text on the left includes the ECS logo, the society's name, its mission, the meeting details, and a slogan. A blue button with white text is positioned between the text and the photo.

ECS The Electrochemical Society
Advancing solid state & electrochemical science & technology

243rd Meeting with SOFC-XVIII
Boston, MA • May 28 – June 2, 2023
Accelerate scientific discovery!

Learn More & Register

Response growth and yield of okra (*Abelmoschus esculentus* L.) to giving dosage levels of chicken manure and variation of plants spacing

Kartina A M *, P Utama, and I Dimiyati

Department of Agroecotechnology, Faculty of Agriculture, University of Sultan Ageng Tirtayasa. Jl. Raya Jakarta KM.4 Campus Pakupatan, Serang City, Banten.

*Corresponding author: kartina_plg@yahoo.com

Abstract. This research was aimed to the response of dosage of chicken manure and variation of plants spacing on the growth and yield of Okra (*Abelmoschus esculentus* L.). This research was conducted from December 2018 until March 2019 in the Experimental Garden of Indonesia Vegetables Research Institute, Situ Gadung, Tangerang, Banten. This research used a Randomized Completely Block Design (RCBD) with two factors, the first factor was a dosage of chicken manure consisting of three levels P1 (25 ton/ha), P2 (30 ton/ha), and P3 (35 ton/ha) and the second factor was variation of plants spacing consisting of three levels J1 (40 cm x 50 cm), J2 (50 cm x 50 cm), and J3 (60 cm x 50 cm). The results showed that treatment of 35 ton/ha chicken manure (P3) had the best effect at plant height (24.89 cm) and number of leaves (7.59 leaf) on 30 days after planting, number of flowers (10.48 flowers) and number of fruits per plant (10.00 fruits) on 80 days after planting, number of fruits per plot (154.44 fruits) and mass of fruits per plot (4.02 ton/ha) on 90 days after planting, and mass of fruits per plant (4.64 ton/ha) on 100 days after planting. The variation of plants spacing had the best effect to number of fruits per plot (114.67 fruits) on 80 days after planting and mass of fruits per plot (1.9 ton/ha) on 70 days after planting. There was interaction between dosage of chicken manure and variation of plants spacing at number of leaves on 30 days after planting, number of flowers on 70, 80, and 100 days after planting, number of fruits per plant on 50, 70, 80, and 100 days after planting, number of fruits per plot on 50, 60, 70, 80, and 90 days after planting.

Keywords: okra, chicken manure, plant spacing, growth, crop yields.

1. Introduction

Okra is a plant that belongs to the *Malvaceae* family and comes from the tropical part of Africa. Okra fruit can be used as a vegetable, in 100 g okra fruit contains 88% water, 2.1% protein, 0.2% fat, 8% carbohydrate, 1.7% fiber, and 0.2% ash [1]. The importance of the nutrients contained in the okra fruit makes the plant widely produced commercially. However, in some tropical countries the optimum yield of okra (2-3 ton/ha) and high quality cannot be achieved, due to the continued decline in soil fertility [2]. According to [3], the use of organic materials such as chicken manure has an important role in improving the quality and nature of the soil, among others, increasing the binding capacity of sandy soil (improving sandy soil structure), improving clay soil structure so that the soil that was originally heavy will be light, increase the ability of the soil to collect water so that the soil can provide more water for plants, improve drainage and soil air system (especially heavy soil) so that the water content is sufficient, enhance the binding capacity of the soil so that the soil becomes more resistant, not easily dissolved by irrigation water. According to [4], fertilizer dosage of chicken manure with a dose of 30 ton/ha, gives



the best effect on the parameters of stem diameter, wet weight and dry weight of stems of okra plants. Based on the results of research by [6], the spacing of 50 cm x 50 cm gives the best results on the parameter number of fruits per plot (321.25 fruits). This research aims to determine the effect of dosing of chicken manure fertilizer and variation of planting distance on the growth and yield of okra (*Abelmoschus esculentus* L.).

2. Research Methods

This research was conducted from December 2018 until March 2019 took place at the Experimental Garden of the Situ Gadung Vegetable Research Institute, Pagedangan District, Tangerang Regency, Banten Province. The materials used in this research were the seeds of green okra varieties of Naila IPB, fertilizer for chicken manure, pesticides, soil and water. The tools used in this study are paper, buckets, scales, hoes, roll meters, stationery, scissors, embrats, stakes, rapia ropes, shovels, machetes, tractors, seed tray and cameras.

This research used a Randomized Completely Block Design (RCBD) with two factors, the first factor was a dosage of chicken manure consisting of three levels P1 (25 ton/ha), P2 (30 ton/ha), and P3 (35 ton/ha) and the second factor was variation of plants spacing consisting of three levels J1 (40 cm x 50 cm), J2 (50 cm x 50 cm), and J3 (60 cm x 50 cm). There were 9 treatment combinations, each of which was repeated 3 times so that there were 27 experimental units and 3 plants were used as samples. The parameters observed in this study are as follows: Plant Height (cm), Number of Leaves (strands), Number of Flowers (flowers), Number of Fruits Per Plant (fruit), Number of Fruits Per Plot (fruit), Weight of Fruits Per Plant (g), and Fruit Weight Per Plot (g).

In this study, Anova analysis of variance was used using DSAASTAT 1.101 software. If the results of the variance have a significant effect (*) or very real (**), then further tests are conducted. In this study, Duncan Multiple Range Test 5% was tested further.

3. Results and Discussion

3.1. Plant Height (cm)

Based on the variance, the treatment of fertilizer levels of chicken manure gave a very significant influence on the growth of okra plant height at the age of 10 DAP and 30 DAP. Table 1 depict the dosage of chicken manure fertilizer dose of 35 ton/ha gave the best effect on the height of okra plants at 30 DAP (24.89 cm).

Table 1. Average height of okra (*Abelmoschus esculentus* L.) plants in the administration of chicken manure dose doses and variations in plants spacing

Plant Age (DAP)	Manure Feces Chicken Animals (P) (Ton/ha)	Plant Height			Average
		Plants Spacing (J)			
		40 cm x 50 cm (J1)	50 cm x 50 cm (J2)	60 cm x 50 cm (J3)	
10	25 (P1)	10.27	9.78	9.55	9.87 a
	30 (P2)	10.61	10.83	9.66	10.37 a
	35 (P3)	10.66	11.66	11.72	11.35 b
	Average	10.51	10.76	10.31	10.53
20	25 (P1)	13.44	13.50	13.61	13.52
	30 (P2)	16.06	14.50	13.83	14.80
	35 (P3)	14.78	15.83	15.17	15.26
	Average	14.76	14.61	14.20	14.52
30	25 (P1)	20.55	20.11	21.78	20.81 a
	30 (P2)	23.50	21.67	22.50	22.56 b
	35 (P3)	24.89	26.22	23.56	24.89 c
	Average	22.98	22.67	22.61	22.75

Note: numbers followed by the same letters in the same column show no significant difference according to the DMRT test of 5% level.

This is presumed that the application of fertilizer at a dose of 35 ton/ha is able to meet the needs of okra plant nutrients, one of them is nutrient N which can meet the needs of okra plants. This is also in accordance with the opinion of [6], the biggest contribution of chicken manure fertilizer was the nutrient content of N. This nutrient can affect the vegetative growth of plants which ultimately determines the reproductive phase and crop yield.

3.2. Number of Leaves (strands)

The treatment of chicken manure fertilizer dosage has a very significant influence on the growth of the number of leaves of okra at 30 DAP, and there is an interaction between treatments at 30 DAP. This is in accordance with the opinion of [7], the availability of sufficient N can increase the growth of plant organs, one of which is the process of leaf formation.

Table 2. average number of leaves of okra (*Abelmoschus esculentus* L.) leaves on dosing of chicken manure feces and variations in plants spacing.

Plant Age (DAP)	Manure Feces Chicken Animals (P) (ton/ha)	Number of Leaves			Average
		Plants Spacing (J)			
		40 cm x 50 cm (J1)	50 cm x 50 cm (J2)	60 cm x 50 cm (J3)	
10	25 (P1)	4.33	3.67	4.22	4.04
	30 (P2)	4.56	3.67	4.00	4.07
	35 (P3)	4.00	4.44	5.00	4.48
	Average	4.26	3.93	4.41	4.20
20	25 (P1)	3.89	4.78	5.00	4.56
	30 (P2)	5.44	4.33	5.11	4.96
	35 (P3)	5.89	5.56	4.44	5.30
	Average	5.07	4.89	4.85	4.94
30	25 (P1)	5.00 a	5.78 b	6.11 b	5.63 a
	30 (P2)	7.22 c	6.22 b	7.11 c	6.85 b
	35 (P3)	8.11 d	8.89 e	5.78 b	7.59 c
	Average	6.78	6.96	6.33	6.69

Note: numbers followed by the same letter in the same row or column show no significant difference according to the DMRT test of 5% level.

Based on Table 2, it shows that the dosage of chicken manure 35 ton/ha gives the best number of leaves at 80 DAP (7.59 strands) based on these data it is suspected that in chicken manure 35 ton/ha is able to provide better nutrient needs compared to other animal manure fertilizer doses.

There was a treatment interaction at the age of 30 DAP, a combination of 35 ton/ha chicken manure fertilizer treatment with a spacing of 50 cm x 50 cm gave the best number of leaves (8.89 strands). This is because the combination of nutrients available is able to meet the needs of plants and a spacing of 50 cm x 50 cm is able to provide more efficient space for plants to grow.

3.3. Number of flower (flower)

The treatment of chicken manure fertilizer dosage has a significant effect on the number of flowers of okra plants at the age of 70 DAP and 80 DAP, very significant effect on 100 DAP. And there are interactions between treatments at the age of 70 DAP, 80 DAP and 100 DAP. Based on Table 3, it shows that the fertilizer dosage of chicken manure 35 ton/ha gives the best amount of flowers at 80 DAP (10.48 flowers).

There was an interaction between treatments at the age of 80 DAP, a combination of 35 ton/ha fertilizer dosage with a spacing of 50 cm x 50 cm. gives the best amount of interest (14.78 flowers). This is presumed at a dose of 35 ton/ha provides a better nutrient P compared to other dung fertilizer doses. And the spacing of 50 cm x 50 cm gives room to grow better for okra plants compared to other planting distances.

This is consistent with the opinion of [8], that the nutrient P plays an important role in plant reproduction, the availability of sufficient P directs higher crop production. The more flowers will produce more and more fruit.

Table 3. The average amount of flowers of okra (*Abelmoschus esculentus* L.) in the dosing of chicken manure feces and variations in plants spacing

Plant Age (DAP)	Manure Feces Chicken Animals (P) (ton/ha)	Number of flower			Average
		Plants Spacing (J)			
		40 cm x 50 cm (J1)	50 cm x 50 cm (J2)	60 cm x 50 cm (J3)	
60	25 (P1)	1.22	2.00	2.78	2.00
	30 (P2)	2.67	1.89	3.11	2.55
	35 (P3)	3.22	3.22	2.44	2.96
	Average	2.37	2.37	2.78	2.51
70	25 (P1)	3.00 a	6.89b c	7.56b c	5.81 a
	30 (P2)	6.33 b	4.00 a	8.78 d	6.37 a
	35 (P3)	8.44 cd	12.11 e	6.44 b	9.00 b
	Average	5.93	7.67	7.59	7.06
80	25 (P1)	4.89 a	7.22 b	9.44 c	7.19 a
	30 (P2)	8.44 bc	5.78 a	11.78 d	8.67 b
	35 (P3)	9.56 c	14.78 e	7.11 b	10.48 c
	Average	7.63	9.26	9.44	8.78
90	25 (P1)	5.11	9.56	9.22	7.96
	30 (P2)	10.11	6.78	8.33	8.41
	35 (P3)	10.67	12.11	7.33	10.04
	Average	8.63	9.48	8.30	8.80
100	25 (P1)	300 a	5.11 c	5.44 c	4.52 a
	30 (P2)	5.78 c	4.00 b	10.67 e	6.81 b
	35 (P3)	7.78 d	7.33 d	5.11 c	2.67 b
	Average	5.52	5.48	7.07	6.02

Note: numbers followed by the same letter in the same row or column show no significant difference according to the DMRT test of 5% level.

3.4. Number of Fruits Per Plant (fruit)

The treatment of chicken manure fertilizer dosage has a significant effect on the number of fruits per plant at the age of 70 DAP, 80 DAP, and 100 DAP. And there are interactions between treatments at the age of 50 DAP, 70 DAP, 80 DAP, and 100 DAP.

Based on Table 4, shows the fertilizer dosage of chicken manure 35 ton/ha gives the best number of fruits per plant at 80 DAP (10.00 fruits).

There was an interaction between treatments at the age of 80 DAP, a combination of 35 ton/ha fertilizer dosage with a spacing of 50 cm x 50 cm. gives the best number of fruits per plant (13.78 fruits). This is presumably at a dosage of 35 ton/ha of chicken manure provides N elements that are able to meet the needs of okra plants.

This is in accordance with the opinion of [9], that nitrogen is one of the photosynthetic materials which directly affects plant production. Nitrogen plays an important role in producing assimilates needed to produce fruit, N deficiency can reduce fruit production.

Table 4. Average number of fruits per plant okra (*Abelmoschus esculentus* L.) plant in the dosing of chicken manure feces and variations in plants spacing

Plant Age (DAP)	Manure Feces Chicken Animals (P) (ton/ha)	Number of Fruits Per plant			Average
		Plants Spacing (J)			
		40 cm x 50 cm (J1)	50 cm x 50 cm (J2)	60 cm x 50 cm (J3)	
60	25 (P1)	1.22	2.00	2.78	2.00
	30 (P2)	2.56	1.89	3.00	2.48
	35 (P3)	3.00	3.22	2.44	2.89
	Average	2.26	2.37	2.74	2.46
70	25 (P1)	2.78 a	6.11 cd	7.67 cde	5.52 a
	30 (P2)	6.33 cd	3.89 b	8.56 f	6.26 a
	35 (P3)	8.44 ef	11.89 g	6.44 cd	8.93 b
	Average	5.85	7.30	7.56	6.90
80	25 (P1)	4.33 a	6.45 bc	9.44 d	6.78 a
	30 (P2)	7.78 c	5.56 b	11.33 e	8.22 b
	35 (P3)	9.11 d	13.78 f	7.11 c	10.00 c
	Average	7.07	8.63	9.30	8.33
90	25 (P1)	4.89	8.78	9.00	7.56
	30 (P2)	8.89	6.67	8.33	7.96
	35 (P3)	10.67	12.11	6.89	9.89
	Average	8.15	9.19	8.07	8.47
100	25 (P1)	3.00 a	4.89 c	5.44 cd	4.44 a
	30 (P2)	5.78 d	4.00 b	10.00 f	6.59 b
	35 (P3)	7.67 e	7.33 e	5.44 cd	6.81 b
	Average	5.48	5.41	6.96	5.95

Note: numbers followed by the same letter in the same row or column show no significant difference according to the DMRT test of 5% level.

And at a distance of 50 cm x 50 cm okra plants can grow better because at the planting distance reduces the risk of competition between plants both nutrient competition and growing space. This is in accordance with the research of [5], that the use of spacing of 50cm x 50 cm can produce optimum okra production.

3.5. Number of Fruits Per plot (fruit)

The treatment of chicken manure fertilizer dosage has a significant effect on the number of fruits per plot at the age of 50-70 DAP, and 90-100 DAP. The treatment of variations in plant spacing has a significant effect on the age of 80 DAP. And there are interactions between treatments at the age of 50-90 DAP.

Based on Table 5, shows the dosage of chicken manure 35 ton/ha gives the best number of fruits per plot at 90 DAP (154.44 fruits). And the variation of plant spacing of 50 cm x 50 cm gives the best number of fruits per plot (122.78 fruits). The combination of 35 ton/ha fertilizer dosage with spacing of 50 cm x 50 cm gives the best number of fruits per plot (184.67 fruits).

Table 5. Average number of fruits per plot of okra (*Abelmoschus esculentus* L.) plant in the dosing of chicken manure feces and variations in plants spacing

Plant Age (DAP)	Manure Feces Chicken Animals (P) (ton/ha)	Number of Fruits Per Plot plants spacing (J)			Average
		40 cm x 50 cm	50 cm x 50 cm	60 cm x 50 cm	
		(J1)	(J2)	(J3)	
60	25 (P1)	21.67 a	36.00 b	38.67 b	32.11 a
	30 (P2)	47.67 cd	22.67 a	40.00 bc	36.78 a
	35 (P3)	54.33 d	70.33 e	32.33 b	52.33 b
	Average	41.22	43.00	37.00	40.41
70	25 (P1)	53.33 a	74.33 bc	76.33 bc	68.00 a
	30 (P2)	89.00 c	59.33 a	86.33 c	78.22 a
	35 (P3)	123.33 d	160.00 e	65.00 ab	116.11 b
	Average	88.56	97.89	75.89	87.44
80	25 (P1)	60.33 a	114.00 e	89.33 bcd	87.89
	30 (P2)	95.67 d	74.33 ab	90.00 bcd	86.67
	35 (P3)	92.00 cd	155.67 f	78.33 bc	108.67
	Average	82.67 a	114.67 b	85.89 a	94.41
90	25 (P1)	81.00 a	98.00 bc	104.00 cd	94.33 a
	30 (P2)	116.33 d	85.67 ab	120.00 d	107.33 a
	35 (P3)	160.67 e	184.67 f	118.00 d	154.44 b
	Average	119.33	122.78	114.00	118.70
100	25 (P1)	66.33	83.67	91.33	80.44 a
	30 (P2)	100.67	72.67	90.67	88.00 a
	35 (P3)	148.67	134.00	83.67	122.11 b
	Average	105.22	96.78	88.56	96.85

Note: numbers followed by the same letter in the same row or column show no significant difference according to the DMRT test of 5% level.

It is assumed that at a distance of 50 cm x 50 cm, there is a quite large population, but the level of competition between plants is not as high as other plant spacing, and the fertilizer dosage of 35 ton/ha is able to meet the nutrient needs of okra plants so that it can produce more fruit. This is in accordance with the opinion of [5] in his research, that the provision of fertilizer with a higher dose causes plants to absorb more nutrients so that it affects the increase in vegetative growth of plants which ultimately also affects the increasing number of okra fruit.

3.6. Fruit Weight Per Plant (g)

The treatment of chicken manure fertilizer dosage has a significant effect on fruit weight per plant at 100 DAP. And there are interactions between treatments at the age of 50 DAP, 80 DAP, 90 DAP and 100 DAP. Based on Table 6, it shows that the treatment of chicken manure 35 ton/ha gives the best fruit weight per plant at the age of 90 DAP (131.59 g). There is an interaction between treatments, a combination of 35 ton/ha fertilizer dosage with a spacing of 50 cm x 50 cm gives the best fruit weight per plant (165.83 g).

This is presumably at a dose of chicken manure 35 ton/ha is able to provide nutrients for plants, and it is estimated that the spacing of 50 cm x 50 cm is a more favorable planting distance for the growth of okra plants. This is in accordance with the opinion of [10] growing spacing can reduce competition between plants, so that the process of photosynthesis can be maximized. The resulting photosynthate can be used for plant growth and reproduction. And in the opinion of [11] that competition between plants will not occur as long as plant population density has not reached the threshold, where the resources needed by plants are limited. Wide planting distance causes plants not to be shaded with each

other so that the absorption of sunlight can be maximized, so that the process of photosynthesis in the leaves also runs optimally and the high photosynthate produced can be used in plant growth.

Table 6. Average weight of fruits per plant okra (*Abelmoschus esculentus* L.) plant in the dosing of chicken manure feces and variations in plants spacing

Plant Age (DAP)	Manure Feces Chicken Animals (P) (ton/ha)	Weight of Fruits Per Plant			Average
		Plants Spacing (J)			
		40 cm x 50 cm (J1)	50 cm x 50 cm (J2)	60 cm x 50 cm (J3)	
60	25 (P1)	12.23	17.98	37.84	22.69
	30 (P2)	26.25	16.24	34.41	25.63
	35 (P3)	39.82	42.83	22.67	35.11
	Average	26.10	25.69	31.64	27.81
70	25 (P1)	40.62	57.87	59.07	52.52
	30 (P2)	54.04	31.25	60.76	48.68
	35 (P3)	89.72	107.83	43.95	80.50
	Average	61.46	65.65	54.59	60.57
80	25 (P1)	39.05 a	48.01 a	85.23 cd	57.43
	30 (P2)	73.59 bc	40.97 a	90.33 d	68.30
	35 (P3)	65.49 b	115.65 e	61.81 b	80.98
	Average	59.37	68.21	79.13	68.90
90	25 (P1)	55.48 a	104.31 c	130.73 cd	96.84
	30 (P2)	106.93 c	71.36 a	136.79 d	105.03
	35 (P3)	140.96 d	165.83 e	87.98 b	131.59
	Average	101.12	113.83	118.50	111.15
100	25 (P1)	47.33 a	71.58 b	91.41 c	70.11 a
	30 (P2)	91.97 c	56.52 ab	140.98 e	96.49 b
	35 (P3)	116.68 d	125.51 de	92.51 c	111.57 c
	Average	85.33	84.53	108.30	92.72

Note: numbers followed by the same letter in the same row or column show no significant difference according to the DMRT test of 5% level.

3.7. Fruit Weight per Plot (g)

The treatment of chicken manure fertilizer dosage has a significant effect on the number of fruits per plot at the age of 50-70 DAP, and 90 DAP. The treatment of variations in plant spacing has a significant effect on the age of 80 DAP. And there are interactions between treatments at the age of 50-90 DAP. Based on Table 7 shows that the dosage of chicken manure 35 ton/ha gives the best fruit weight per plot (2413.90 g). And the treatment of spacing of 50 cm x 50 cm gives the best average fruit weight per plot (1924.17 g). The combination of 35 ton/ha fertilizer dosage with spacing of 50 cm x 50 cm gives the best fruit weight per plot (3152.82 g).

Table 7. Average Weight of Fruits Per Plot of Okra (*Abelmoschus esculentus* L.) Plant in the Dosing of Chicken Manure Feces and Variations in Plants Spacing

Plant Age (DAP)	Manure Feces Chicken Animals (P) (ton/ha)	Weight of Fruits Per Plot			Average
		Plants Spacing (J)			
		40 cm x 50 cm (J1)	50 cm x 50 cm (J2)	60 cm x 50 cm (J3)	
60	25 (P1)	213.62 a	354.48 bc	446.09 c	338.06 a
	30 (P2)	559.44 d	264.17 ab	406.13 c	409.91 a
	35 (P3)	815.16 e	877.96 e	370.88 bc	688.00 b

Plant Age (DAP)	Manure Feces Chicken Animals (P) (ton/ha)	Weight of Fruits Per Plot			Average
		Plants Spacing (J)			
		40 cm x 50 cm (J1)	50 cm x 50 cm (J2)	60 cm x 50 cm (J3)	
	Average	529.41	498.87	407.70	478.66
70	25 (P1)	508.41 ab	833.64 de	702.39 cd	681.48 a
	30 (P2)	969.35 e	590.47 bc	820.20 de	793.34 a
	35 (P3)	1320.56 f	2023.55 g	375.49 a	1239.87 b
	Average	932.77 b	1149.22 c	632.69 a	904.90
80	25 (P1)	617.05 a	849.64 bc	1073.63 cd	846.77
	30 (P2)	1113.36 d	790.95 ab	1053.96 cd	986.09
	35 (P3)	626.14 a	1907.19 e	1031.94 cd	1188.43
	Average	785.52	1182.60	1053.18	1007.10
90	25 (P1)	971.61 a	1589.05 b	1617.19 b	1392.62 a
	30 (P2)	1663.13 b	1030.64 a	1681.77 b	1458.51 a
	35 (P3)	2326.19 c	3152.82 d	1762.69 b	2413.90 b
	Average	1653.64	1924.17	1687.22	1755.01
100	25 (P1)	924.14	1167.28	2763.48	1618.30
	30 (P2)	1858.62	1087.52	1284.74	1410.29
	35 (P3)	2397.35	2261.50	1334.77	1997.87
	Average	1726.70	1505.43	1794.33	1675.49

Note: numbers followed by the same letter in the same row or column show no significant difference according to the DMRT test of 5% level.

[12] states that the increase in pod yields at certain plant spacing and N doses is due to the efficient utilization of resources and leads to optimum morphological growth character to support the increase in yield of okra fruit.

4. Conclusion and Recommendation

Based on the results of research that has been done, it can be concluded as follows:

- (1). Chicken manure 35 ton/ha (P3) showed the best effect at plant height (24.89 cm) and number of leaves (7.59 leaf) on 30 days after planting, number of flowers (10.48 flowers) and number of fruits per plant (10.00 fruits) on 80 days after planting, number of fruits per plot (154.44 fruits) and mass of fruits per plot (4.02 ton/ha) on 90 days after planting, and mass of fruits per plant (4.64 ton/ha) on 100 days after planting.
- (2). The variation of plants spacing 50 cm x 50 cm showed the best effect to number of fruits per plot (114.67 fruits) on 80 days after planting and mass of fruits per plot (1.9 ton/ha) on 70 days after planting.
- (3). There was interaction between dosage of chicken manure and variation of plants spacing to parameters number of leaves on 30 days after planting, number of flowers on 70, 80, and 100 days after planting, number of fruits per plant on 50, 70, 80, and 100 days after planting, number of fruits per plot on 50, 60, 70, 80, and 90 days after planting.

Therefore, the cultivation of okra plants can be used dosage of chicken manure fertilizer 35 ton/ha with a spacing of 50 cm x 50 cm. Further research is needed to investigate impact of other types of animal manure fertilizers and spacing planting variation to the growth and yield of okra plants.

5. References

- [1] Akanbi, W.B., A.O. Togun., J.A. Adediran., dan E.A.O. Ilupeju. 2010. Growth, Dry Matter and Fruit Yields Components of Okra under Organic and Inorganic Sources of Nutrients. American-Eurasian Journal of Sustainable Agriculture. **4(1)**: 1-13.

- [2] El-Kader, A.A.A., S.M. Shaaban, dan M.S. Abd El-Fattah. 2010. Effect of Irrigation Levels and Organic Compost on Okra Plants (*Abelmoschus esculentus* L.) Grown in Sandy Calcareous Soil. *Agriculture and Biology Journal of North America*. **1(3)**: 255-231.
- [3] Murbandono, H. S. 2008. *Compost Making*. Jakarta: Swadaya.
- [4] Martini, Riska Amalia. 2018. Effectiveness Test Application of 6.5 L Chicken and Atonic Manure on Growth and Yield of Okra (*Abelmoschus esculentus* L.) Plants. Mataram. University of Mataram.
- [5] Raditya, J., E.D. Purbajanti, and W. Slamet. 2017. Growth and Production of Okra (*Abelmoschus esculentus* L.) at Different Nitrogen Fertilization Levels and Spacing. *J. Agro Complex* **1(2)**: 49-56.
- [6] Barus, R.A.A., Chairani H, and Rosita S. 2018. Response of Growth and Production of Two Okra Varieties (*Abelmoschus esculentus* L) to Provision of Various Types of Organic Fertilizers. *Journal of Agroecotechnology*. **6(2)**: 253-258.
- [7] Maghfoer, M.D., R. Soelistyono, and N. Herlina. 2013. Response of eggplant (*Solanum melongena* L.) to combination of inorganic-organic N and EM4. *Agrivita*. **35(3)**: 296 – 303.
- [8] Pranata I., D.R. Lukiwati, and W. slamet. 2017. Growth and Production of Okra (*Abelmoschus esculentus* L.) with Various Organic Fertilizer enriched with Phosphate Rock. *J. Agro Complex* **1 (2)**: 65-71.
- [9] Ayissa, T. dan F. Kebede. 2011. Effect of Nitrogenous Fertilizer on the Growth and Yield of Cotton (*Gossypium hirsutum* L.) Varieties in Middle Awash, Ethiopia. *J. of the Drylands* **4 (1)**: 248 – 258.
- [10] Arifah, S.H., Murti A and Yulia E.S. 2019. Effectiveness of Manure and Plant Spacing on Okra (*Abelmaschus esulentus* L. Moench) Crops. *Journal of Tropical and Subtropical Agricultural Sciences*. **4 (1)**: 38-42.
- [11] Maurya, R. P., J. A. Bailey, and J. S. A. Chandler. 2013. Impact of Plant Spacing and Picking Interval on The Growth, Fruit Quality and Yield of Okra (*Abelmoschus esculentus* L.) Moench). *American Journal of Agriculture and Forestry* **1(4)**: 48-54.
- [12] Onyegbule U. N., S. O. Ngbede, E. I. Nwanguma, dan A. Ohaneze. 2012. Evaluation of Okra Performance to Different Rates of Poultry Manure and Plant Population Density. *Continental. J. Agric. Sci.* **6(3)**: 56-63.

Response growth and yield of okra (*Abelmoschus esculentus* L.) to giving dosage levels of chicken manure and variation of plants spacing

ORIGINALITY REPORT

22%
SIMILARITY INDEX

18%
INTERNET SOURCES

14%
PUBLICATIONS

9%
STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

3%
★ **aipublications.com**
Internet Source

Exclude quotes On
Exclude bibliography On

Exclude matches Off