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Effect of Organic NPK Fertilizer Dose and Coconut Water on the Growth and Yield of Pariah (*Momordica Charantia* L.)

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Abstract:

Research conducted in the Padang Sari Village, Tinggi Raja Subdistrict, Asahan District, Province North Sumatra. This research was conducted from February to April 2016. This study was conducted in randomized block design Factorial with 2 factors and three replications. The first factor is the organic NPK fertilizer (N) consists of three levels ie: N0: 0 g per crop (control), N1: 50 g per crop, and N2: 100 g per crop. The second factor is the giving of an old coconut water (K) consists of four levels ie: K1: 200 ml per plot (50 ml per polybag), K2: 400 ml per plot (200 ml per polybags). Results shown Organic NPK fertilizer give a significant effect on growth pariah crop, with the best organic NPK fertilizer treatment at doses of 50 gr per crop (241.50 cm). Giving old coconut water showed significant effect on growth pariah crop, the best treatment at a dose of 150 ml per plant (201.94 cm). The interaction between the application of Organic NPK fertilizers and old coconut water on the growth and production of Crop Paria (Momordica charantia L.) in polybags showed no significant effect on the observed parameters.

Key words: organic, NPK, coconut water, pariah

INTRODUCTION

Paria including one type of vegetable commercial potential when cultivated intensively in scale agribusiness. Although the market outlook of paria is quite bright, but cultivation of these crops at the farm level is still a sideline. In general pariah cultivation is done in land scale in grounds and fields without intensive maintenance (Rukmana, 2007).

In Asahan district, plant area of pariah in 2014 covering an area of 82 hectares with harvested area of 82 hectares and the resulting production of 527 tons per year (Indonesia Central Buerau Statistic, 2014).

Among farmers do some action which is believed to increase crop pariah production, one of which is fertilizer suitable for growth and production of the pariah. Fertilization is the giving of fertilizer to crops. Fertilizer is one of the component factors of crop production. Fertilizer applied to land as a source of plant nutrients to meet the needs of the plants that are not able to be satisfied by nutrients that are naturally present in soil (Ronaldo, 2012).

Good and correct fertilization must consider several factors before making fertilizer, such as kind of fertilizer, fertilizer dose, time and route of administration manure fertilization. So if we would do the fertilization then all four of these factors must be considered in order to obtain a satisfactory result. Crops pariah including the types of plants that require nutrients N, P and K in a relatively large amount. Therefore, to get maximum production crops pariah should be given adequate nutrition (Tanijogonegoro, 2012).

Coconut water is one of the waste oil products. This wastes a lot of discarded and not used. Coconut water is the endosperm liquid of the coconut fruit contains organic compounds, hormones auxin and cytokinin that is needed during the vegetative growth phase of the crop pariah (Pierrik

cit. Budiono, 2004). This study aims to determine the effect of Organic NPK fertilizer and Old Coconut Water and interaction on the growth and yield of a pariah (*Momordica charantia* L.) in polybags.

METHOD

Research conducted in the Desa Padang Sari, Tinggi Raja Subdistrict, Asahan District Province North Sumatra. This research was conducted from February to April 2016. Materials used in the study are crop paria varieties Lipa F1, old coconut water, Organic NPK Complete fertilizer, bamboo, water, organic pesticides and other materials that support the implementation of this study. The tools used are hoe, yell, rope, tape measure, sprayer, calculator, research plots board, board lable, sample stakes, machetes and other tools that are needed when the research.

This study was conducted on a randomized block design Factorial with 2 factors and three replications. The first factor is organcic NPK fertilizer (N) consists of three levels ie: N0: 0 g per crop (control), N1: 50 g per crop, and N2: 100 g per crop. The second factor is the giving of old coconut water (K) consists of four levels ie: K1: 200 ml per plot (50 ml per polybag), K2: 400 ml per plot (100 ml per polybag), K3: 600 ml per plot (150 ml per polybag), and K4: 800 ml per plot (200 ml per polybag). The parameters observed are crop length (cm), number of branches (cm), fruit length (cm), productivity per plot (kg).

RESULTS AND DISCUSSION

Crop Length

Table 1 shown that the organic NPK fertilizer with the treatment of 100 g per polybag (N2) results the longest length of the crop that is 241.50 cm, significantly different than the

treatment of 50 g per polybag (N1) which is 169.88 cm and teratment 0 g per polybag (N0) is 142.54 cm, while N1dan N0 both significantly different. Treatment giving old coconut water with dose of 150ml per polybag (K3) result the longest length of the crop that is 201.94 cm, not significantly different compared the treatment K4 (192.67 cm), K2 (177.44 cm) and K1 (166.50 cm) while K2 and K1 not significantly different. While the interaction of organic NPK fertilizer and old coconut water showed no significant effect.

Table 1. Mean Difference Test Results Effect of Organic NPK Fertilizer and Old Coconut Water On Length of Crop Paria age 4 MST (cm)

N/K	K_1	K_2	K_3	K_4	Average
N_0	145,33 a	149,50 a	135,33 a	140,00 a	142,54c
N_1	133,17 a	160,83 a	222,17 a	163,33 a	169,88b
N_2	221,00 a	222,00 a	248,33 a	274,67 a	241,50 a
Average	166,50 a	177,44 a	201,94 a	192,67 a	CV = 15,41 %

Description: Number followed by the same letter in the same row or column showed no significant difference in the level of 5% using LSD

Number of Branches

From the observation and analysis of variance can be seen that the Organic NPK fertilizer and old coconut water showed a significant effect. Interaction of Organic NPK fertilizer and old coconut water showed no significant effect on the observation parameters.

Table 2 shown that the organic NPK fertilizer with the treatment of 50 g per polybag (N1) results the highest number of branches that 10.46 branches, not significantly different compared the treatment of 100 g per polybag (N2) is 10.08 branches but significantly different than treatment 0 g per polybag (N0) ie 8.46 branches. Treatment giving old coconut water with a dose of 150ml per polybag (K3) results the highest number of branches that 10.83 branches, not significantly different compared the treatment K2 (10.06 branches) and the treatment K1 (9,56 branches) but the significant effect on the

treatment K4 (8.22 branches). While interaction Organic NPK fertilizer and Old Coconut Water showed no significant effect.

Table 2. Mean Difference Test Results Effect of NPK Organic Fertilizer and Old Coconut Water On Number of Branches

N/K	K_1	K_2	K_3	K_4	Average
N_0	8,83 a	8,33 a	9,00 a	7,67 a	8,46 b
N_1	9,50 a	10,33 a	13,50 a	8,50 a	10,46 a
N_2	10,33 a	11,50 a	10,00 a	8,50 a	10,08 a
Average	9,56 ab	10,06 a	10,83 a	8,22 b	CV = 18,46 %

Description: Number followed by the same letter in the same row or column showed no significant difference in the level of 5% using LSD

Fruit Length

Based on the observation and analysis of variance can be seen that the Organic NPK fertilizer and old coconut water showed no significant effect. Interaction of Organic NPK fertilizer and old coconut water showed no significant effect on the observation parameters.

Table 3 shown that the organic NPK fertilizer with the treatment of 100 g per polybag (N2) results the longest fruit length is 19.08 cm, not significantly different compared the treatment of 50 g per polybag (N1) is 19.04 cm and no significant difference in treatment 0 g per polybag (N0) is 18.85 cm and the treatment N1 and N0 showed each other was not significantly different. Treatment giving old coconut water with a dose of 100 ml per polybag (K2) results the longest fruit length is 19.58 cm, not significantly different from the treatment K3 (19.22 cm), the treatment of K4 (19.00 cm) and K1 (18, 17 cm). While interaction Organic NPK fertilizer and Old Coconut Water shown no significant effect.

Table 3. Mean Difference Test Results Effect of NPK Organic Fertilizer and Old Coconut Water On Fruit Length (cm)

N/K	K_1	K_2	K_3	K_4	Average
N_0	17,75 a	19,50 a	18,83 a	19,33 a	18,85 a
N_1	19,08 a	19,75 a	19,33 a	18,00 a	19,04a
N_2	17,67 a	19,50 a	19,50 a	19,67 a	19,08a
Average	18,17 a	19,58a	19,22a	19,00a	CV = 6,30%

Description: Number followed by the same letter in the same row or column showed no significant difference in the level of 5% using LSD

Productivity Per Plot (kg)

Based on the observation and analysis of variance can be seen that the organic NPK fertilizer and old coconut water showed no significant effect. Interaction of Organic NPK fertilizer and old coconut water showed no significant effect on the observation parameters.

Table 4 shown that organic NPK fertilizer with the treatment of 100 g per polybag (N2) results the heaviest productivity per plot is 2.20 kg, was not significantly different compared the treatment of 50 g per polybag (N1) is 2.11 kg and were not significantly different on treatment 0 g per polybag (N0) is 2.15 kg and the treatment N1 and N0 showed each other was not significantly different. Treatment giving old coconut water with a dose of 100 ml per polybag (K2) results the heaviest productivity per plot is 2.24 kg, was not significantly different compared the treatment K3 (2.19 kg), the treatment of K1 (2,10 kg) and K4 (2 , 08 kg), while K3, K1 and K4 showed each other was not significantly different. Interaction Organic NPK fertilizer and old coconut water showed no significant effect.

Table 4. Mean Difference Test Results Effect of NPK Organic Fertilizer and Old Coconut Water On Productivity per Plot (cm)

N/K	K_1	K_2	K_3	K_4	Average
N_0	2,13 a	2,26 a	2,15 a	2,07 a	2,15 a
N_1	2,03 a	2,24 a	2,22 a	1,96 a	2,11 a
N_2	2,15 a	2,23 a	2,20 a	2,22 a	2,20 a
Average	2,10 a	2,24 a	2,19 a	2,08 a	CV = 10,17 %

Description: Number followed by the same letter in the same row or column showed no significant difference in the level of 5% using LSD

DISCUSSION

The effect is not significant to the crop length age 2 allegedly because of Organic NPK has not undergone a process of decomposition and root crops have not been able to absorb the nutrients from Organic NPK fertilizers, making nutrients available in manure can not be well supplied in the soil causes the roots of the plant can not absorb the nutrients throughout the all of plant tissue. Organic fertilizer contain nutrients that low to meet the needs of plants quickly so slowly available to plants (Wijaya, 2008).

Results of further tests showed that organic NPK fertilizer at a dose of 100 g per polibag results best effect for growth of crop length. According to Lingga (2008), in plants whose growth is apical dominant on the tip (end tendrils), nutrients N and P are indispensable for cleavage sel. At dose of 50 g per polybag results the best effect on the growth of the number of branches. This is because the nutrients that plants need for each phase of plant growth is different.

The effect is not significant different with fruit length and yield per plot, this is thought to be caused content of fertilizers applied already experienced an increasing to the plant generative process or production process allegedly because most fertilizer has undergone a washing process due to the intensity of rainfall is quite high so availability nutrients in the soil is decreased mainly nutrients P and K.

Based on the analysis of variance showed that giving old coconut water showed no significant effect on the crop length, and the significant effect on the number of branches and no significant effect on the fruit length and the productivity per plot.

There are not significant effect on the crop length and productivity of crop pariah cause giving old coconut water in this case is the waste that has experienced a decreasing in nutrients than young coconut water (Kristina and Shaheed, 2012). In the old coconut water, nutrients N is not there and nutrients P experienced a decreasing, but increase in nutrient K while nutrients N and P serves as plant growth and increase fruits production.

K nutrient that increases in the water content of the old coconut serves as Boost growth in the growing point as the establishment of branches more so for the result of variance in the number of branch significant effect. In addition, coconut water contains hormone cytokinin, auxin and gibberellin (Suryanto, 2009).

According to Dewi (2008), Cytokines are PGR which led to the division (cytokinesis). Antagonistic interaction between auxin and cytokinin is also one way plants regulate the degree of growth of roots and shoots, for example, the number of roots that many will produce cytokines in large quantities. Increasing concentrations of these cytokines will cause the system shoots establish branches in greater numbers. Widiastoety (2003) said vitamin C contained in coconut water can help stimulate the growth of plants. The content of coconut water are auxin, gibberellins and cytokinins, differentiation takes place when there is interaction between auxin and cytokinin that will encourage the formation of shoots.

According to Ellyfa (2013) that the composition of coconut water is determined by several factors: the type of coconut and fruit maturity. Coconut water from young coconuts results better growth compared with the old coconut because the type cytokinin zeatin most active is contained in coconut water.

Giving old coconut water does not significantly affect the crop length, fruit length, and productivity per plot pariah, as

this parameter is more effected by the genetic properties of the plant. According Nyakpa et *al.* (1988), plant growth is effected by environmental and genetic factors. Genetic trait is a trait inherited from elders is the result of the merger between the nature of male and female elders.

CONCLUSSION

The best dose of Organic NPK fertilizer merk Yellow Bamboo in N3 treatment (100 g per polybag) to the crop length age 3 and age 4 weeks after planting and, the best dose in N2 treatment (50 g per polybag) to the number of branch crops pariah. The best dose of old coconut water at treatment K3 (150 ml per polybag) to the number of branch crops pariah. There is no interaction between Organic NPK fertilizer and old coconut water showed no significant effect on all parameters observed.

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