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Influence Several Method Applications Of Napthalene Acetic Acid (NAA) + Napthalene Acetamide (Naam) and Various Composition Of Planting Media On Wet Weight And Dry Weight Of Rubber Stumps (Hevea brasiliensis Muell - Arg.)

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ABSTRACT

One of the problems faced in rubber cultivation by stump was the high percentage of stump deaths in the field due to the inhibition of root and shoot growth. So that to accelerate root growth can be done by giving growth regulating substances Napthalene acetic acid (NAA) + Napthalene acetamide (NAAm). The purpose of The study was to examine the rubber stump growth response to several methods of application of Napthalene Acetic Acid (NAA) + Napthalene Acetamide (NAAm) and enrich the NAA + NAAm application method on rubber stumps and various composition of growing media. The study was conducted from June 2017 to September 2017 in the research area of the Faculty of Agriculture, University of North Sumatra, Medan. The research design used was a factorial completely randomized design with two factors and three replications, the first factor was NAA + NAAm application (without polishing, polishing on the whole root stump, polishing on cutting stump root cutting, polishing at the lateral root stump) and the second factor is the comparison of the top soil and sand growing media (1: 0, 1: 1, 1: 2, 1: 3). Parameters observed were flexion velocity, shoot percentage, shoot height, shoot diameter, number of leaves, root fresh weight, root dry weight, fresh canopy weight, dry weight of shoot.The results showed that the application of NAA + NAAm did not have a significant effect on all parameters where the results tended to be the best was polishing on the roots of lateral stump (P3). The ratio of the Measuring plantdid not significantly affect all parameters where the interaction between NAA + NAAm application and the composition of the growing medium tended to be the best in the combination of P3M1.

Keyword: Napthalene Acetic Acid (NAA) + Napthalene Acetamide (NAAm), planted media, stump

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1. Introduction

Rubber plant (*Hevea brassilliensis* Muell - Arg.) refers to the spurge *family* (Euphorbiacea, labeled by others word to *rambung, getah, gota, kejai* or *hapea*. Rubber is one of the most important commodities for a source

of non-oil and gas in Indonesia, infinitely it has a quality prospect. This continues to be consummated especially in the field of cultivation technology to increase crop productivity (Indonesian Center for Estate Crops Research and Development, 2010).

The development of rubber plantation area has been increased for the last two years in Indonesia. In 2014, Indonesia's rubber plantations accounted for 3.61 million hectares, while in 2015 it is projected that Indonesia's rubber plantation area will be increasing by 0.43% or 3.62 million hectares (BPS, 2016).

Natural rubber future prospects are still acceptable. Giving the world's supply of natural rubber markets is still expanded and the trend for consumption. Increasing of natural rubber consumption is main object as high demand from rubber industry countries, both for traditional markets (USA, Europe and Japan) or new markets (China, India, Russia and Brazil). China is expected to continue been increasing to natural rubber consumption by up to 4 million tons / year in 2020. In addition, the global economic growth and prosperity of the world's rising economies as well as rising oil and synthetic rubber prices are expected to spur natural rubber consumption increases (International Rubber Study Group, 2005).

Based on the production aspect, rubber productivity of the people is generally low, about 900-1,000 kg / ha / year (50% -60% of production potential). Low productivity rubber is largely due to the fact that most of them have not been using superior clones. The unproductive plants reach 400,000 - 500,000 ha which need to be rejuvenated immediately (The Directorate General of Plantation, 2009).

The important thing of rubber cultivation is the planting material, which for the good planting material is derived from the rubber plantation. Grafting is one of the propagation plants methods that are fulfilled by placing the entres eye from one plant to a similar plant that aims of obtaining superior properties, on the results of the grafting be obtained the superior rubber planting material in the form of budded stump, mini stump, polybag seed, or high stump (Nur et al, 2013).

Budded stump grafting seeds are preferred and used as planting material as the preparation is easier preparing for cheaper price than other grafting seeds. Budded stumps has a weakness that is the high mortality rate (15-20%) caused by the growth of roots and buds (Parto et al, 2005).

The root growth can be accelerated by giving growth regulating substances. There are many regulating substances in the market, including Growtone which contains Naphtalene Acetic Acid (NAA) + Napthalene Acetamide (NAAm). The advantages of Growtone are easy to get, the price is affordable and most importantly suited to a wide variety of plant cuts with its function that stimulates root growth more quickly and reduces the risk of death of cuttings.

Growth regulating substances on planting is a non-nutrient organic compound that can in small quantities support, inhibit, and alter physiological processes. Auksin is one of the growing hormones that are indiscriminate in the process of plant growth and development. Auksin has a number of roles in supporting the life of the allotment, and to stimulate the occurrence of cell extension on shoots and to encourage primordial roots (Artanti, 2007).

Growth regulating substances effectively use in right quantities, hence the high concentrations can damage the base of cuttings, where the cell division and callus will be excessive and prevent shoots and root growth at optimum concentrations below the ineffective (Harahap, 2010).

Goenawan (2006) stated that the treatment of growth regulating substances application method in pasta was the best application method in inducing roots and shoots. In the previous study, Panggabean (2015) found that the administration of NAA + NAAm with some concentrations (0mg, 25mg, 50mg, 75mg) on top soil planting media: sand produced stumpterbaik growth at 25 mg / stump concentration but not maximal due to NAA + NaAm in all parts of the excessive root so that the rubber stump growth is disturbed.

In addition to the use of growth regulating substances, hence it is necessary to grow suitable media to stimulate growth and development. The problem has been adopted from the field that is existence of fertile land on the surface of the earth decreasing. The problem needed an alternative. The land form use transition by using

marginal land as one of them is used of sand as planting media. Agricultural lands will shift from fertile land to marginal lands for extensification efforts to increase agricultural production in Indonesia (Vijayakumar et al, 2000).

Soil condition contains humus the longer existence is diminished for people are beginning to experience the transfer of land use by utilizing marginal lands, such as sandy soil as an alternative planting media. It was previous studies by Panggabean (2015), Sinaga (2015), and Nadapdap (2015) to the comparison of top soil media: sand (1: 0), top soil: sand (1: 1) (1: 2), and top soil: sand (1: 3). The previous studies result is the comparison of top soil media: sand (1: 2)) is the best treatment based on Nadapdap (2015), and top soil comparison (1: 1) is the best treatment based on Panggabea (2015).

The study aims to test the growth of rubber stump response to several methods of Naphtalene Acetic Acid (NAA) + Napthalene Acetamide (NAAm) and enrich the NAA Several method application on rubber stumps in various planting media compositions.

2. Material and Method

The study was conducted in the experimental field of Faculty of Agriculture, University of Sumatera Utara, at a height of ± 25 meters above sea level, from June 2017 to September 2017.

The study materials are rubber stumps derived from clonPB 260 enters and PB 260 , clones underlying stems as Napthalene Acetic Acid (NAA) + Napthalene Acetaamide (NAAm) with Growtone trademark as treatment, top soil and sand as a mixture of planting medium, urea fertilizer, SP-36, KCl and Kieserit, aquades water, 25 x 50 cm polybag size, rubber planting water, chocolate envelope, label, transparent plastic. The study instruments are hoe, fist, meter, slab, bucket, knife, name plaster, calculator, analytical weighing, oven, stationery, 5 mL dropper, and camera.

The study used Completely Randomized Factorial Design by the following treatment. Factor 1: NAAm NAAm + 25 mg / stump; P0: No Scrub; P1: The Whole Stump Root Application; P2: Stump Cutting Cut application; P3: Lateral Stump Roots. Factor 2: Planting Media (M) (Topsoil: Sand); M0: Top Soil; M1: Top Soil: Sand (1: 1); M2: Top Soil: Sand (1: 2); M3: Top Soil: Sand (1: 3)

The study implementation was began by soil preparation with a plot of 155 cm x 65 cm and the distance between 35 cm plots. Mixed plants to homogeneous for putting into polibag sized 25 x 50 cm to ¾ boundary according to treatment.

Stump used is a green budding grafting from Rubber Research Institute of Sungei Putih. Decision Stump is completed after the stump is unloaded using a hoe or pulling jack. Decision stump was collected by a uniform stem diameter of 1.5-2 cm, the root of a straight ride length of 25-35 cm, lateral root length of 5-10 cm, non-branched root, no fork and bark, and not affected by white root mushroom. Decision Stump eye is not more than twice of grafting. The selected stump is cut off root of 30 cm from the root-based.

NAA + NAAm weighed 25mg ,step into a small plastic , and NAA + NAAm was mixed with 2 mL of aquades water to form a paste to applied according to their respective treatment. The observed values are *wet weight.*

3. Hasil dan Pembahasan

3.1 Wet Weight (g)

The results of observation and list of various of wet weight are presented in appendix 31-33. Based on the result of the analysis, the NAA + NaAm and planting media and the interaction were not significantly affected by wet weight.

The average of wet weight of the title to NAA + NaAm and planting media method can be seen on Table 1.
Based on Table 1 can be seen that the treatment of NAA + NAAm of fertilizer method, wet weightis highest at P0 by 11,95g, which is not significantly different from P1 is 11.64 g, P2 is 10.86 g, and P3 is 10 , 71g. According to Bogor Agriculture University (2012) states that root growth and growth of stunts can be triggered due to trial failed by farmers, the occurrence of incompabilistas between root stock and upper root can lead to

the inhibition of early stump growth. In addition there are also many factors that affect synthetic ZPT activities such as plant type, phase / age of growth, and environmental factors. Alfiansyah (2015) adds exogenous auxin can act as a trigger for cell division, enlargement and elongation when the administration is at the limit of optimium concentration.

In media of treatment plant, wet weight was the highest on M1 that was 12.48g which was not significantly different with M0 is 11.99 g, M3 is 10.18 g, and M2 is 10.10g. According to Anisa (2011) a good air system with good water retention and adequate rooting space is the right medium. Whilst proper media usage will provide a balanced and balanced growth can affect metabolic processes on plant tissues and dismantling of elements and organic compounds in the plant's body for growth and development.

Tabel 1. Wet weight (g) in Methods of Application of NAA + NAAm and Measuring Plant Growth 12 MST

Method application	Measuring Growth				Average
	M0	M1	M2	M3	
P0	15.00	9.88	11.58	11.35	11.95
P1	9.93	14.09	10.03	12.53	11.64
P2	11.21	12.84	9.52	9.86	10.86
P3	11.81	13.13	9.06	8.85	10.71
Average	11.99	12.48	10.04	10.64	11.29

3.2 Dry Weight (g)

The results of observation and list of dry weight are presented in appendix 29-32. From the result of the analysis, both variation of NAA and measuring plant interaction have an effect on the dry weight of the title. The average of *dry weight*o f the title from NAA + NAAm and planting media can be seen in Table 2.

Table 2 can be seen that in the treatment of NAA several method applications, the highest dry weight of P0 is 8.50g which is not significantly different from treatment P1 is 8.41 g, P3 is 7.99g, and P2 is 7.36g. Wattimena (1987) declares that other factors affecting the activity of synthetic auxin are: 1) the compound's ability to penetrate the waxy coat or waxy epidermis; 2) translocation properties in plants; 3) conversion of auxin into an inactive compound in the plant (destruction or bonding); 4) interact with other growing hormones; 5) plant species; 6) the burial phase and 7) the environment (temperature, radiation and humidity). Suwasono (1989) states that external factors also play an important role in the success of cutting propagation such as light intensity, humidity and temperature. The high temperature and humidity fluctuations will damage the activity of hormones as biocatalysts. In addition, the application of ZPT is very important to note, considering hence the application of Several method has a big risk that can result in the incompatibility of ZPT.

In Measuring Plant Growth, dry weight of the title tends to highest in M1 to 8.85g which is not significantly different from the treatment of M0 is 8.17 g, M3 is 7.95 g, and M2 is 7.29g. According to Anisa (2011) good soil regulation, water retention and space for adequate rooting are the right medium. The measuring plants usage will provide optimal growth for plants. The addition of sand works to accelerate the rate of water and increase the soil pore space. Zahari et al (1995) says that sufficient groundwater conditions will increase the rate of growth of oxygen condition is available followed by rapid water absorption in the soil.

Tabel 2. Dry weight (g) on methods of application of NAA + NAAm and Measuring Plant Growth 12 MST

Method application	Measuring Growth				Average
	M0	M1	M2	M3	

P0	11,08	7,24	7,68	8,00	8,50
P1	7,12	8,70	8,40	9,44	8,41
P2	6,04	9,54	6,15	7,71	7,36
P3	8,43	9,93	6,93	6,68	7,99
Average	8,17	8,85	7,29	7,95	

4. Simpulan

Naphtalene Acetic Acid (NAA) + Napthalene Acetamide (NAAm) on the lateral roots is better than the whole root and the grease on the back, however it does not indicate a significant difference in the growth of rubber stumps.The composite media of soil: sand (1: 1) is better than soil :sand (1: 2) or top soil: sand (1: 3), it has not yet shown a significant difference in the growth of rubber stump. Several methods of application of NAA + NAAm on lateral roots of soil: sand (1: 1) is better than others in improving the growth of rubber stump.

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