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Effect of Hot Water Immersion Time Upper, Middle and Lower Stems on the Growth of Sugarcane Bud Chip Bululawang Variety

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ABSTRACT
The purpose of this study was to determine and determine the proper soaking time in the upper, middle and lower sugarcane stalks so that the growth is uniform. The experimental design used was a randomized block design (RBD) consisting of 2 factors with 3 replications. The first factor is B 1: Upper stem, B 2: Middle stem, B 3: Rootstock, the second factor is W 1: Control (0 minutes / without hot water immersion), W 2: Soaking hot water for 15 minutes, W 3 : Soaking in hot water for 30 minutes, W 4: Soaking in hot water for 45 minutes, W 5: Soaking in hot water for 60 minutes. The results of the study showed that the B1W5 treatment combination was the treatment that gave the fastest germination day, while the treatment combination B3W1, B3W2, B3W3, B3W4, and B3W5 was the treatment that caused the longest germination day. The lowest yield of the variable percentage of germination was given by the treatment combination B1W5, while the best percentage of germination was given by the combination of treatment B1W2 and B2W4. The best variable of plant height and number of leaves was given by the combination of treatment B1W2 and B2W4, while the lowest was given by the combination of treatment B3W1.

***Keywords**: Bud Chip, Soaking, Bululawang.*

INTRODUCTION
Sugarcane is a sugar-producing plant which is a source of carbohydrates. This plant is very much needed so that its needs continue to increase from the on-farm side, including the preparation of seeds and the quality of sugarcane seeds. Apart from preparing the seeds, the quality of the seeds used also affects the quality of the seeds, because it is a very determining factor for the success of sugarcane cultivation (BPTPS, 2014). Based on some of these problems, it is necessary to have seed preparation technology with a short time, land efficiency and quality seeds. The nursery technique that can produce high-quality seeds and only requires more efficient preparation of land use is the bud chip nursery technique (Putri et al., 2013).

Bud chips are technology for accelerating sugarcane seedlings with one bud obtained using a drilling machine (Yuliardi, 2012). The results of planting with the bud chips method at PTPN X are expected to save the use of seeds (9,000-12,000 seeds / Ha) and also the main advantage is that there are far more tillers (Gostu, 2013), which after being transferred to the sugarcane field are able to form 10 tillers. -20 puppies. The tillers will grow perfectly until the harvest is 8-10 stems per clump, while the seedlings of the mule are only 1-4 tillers (Indonesian Sweetener and Fiber Crops Research Institute, 2013). Currently, the prospect of developing sugarcane using the bud chips method can increase the sugar production per hectare to 13.6 tonnes per hectare. Meanwhile in Indonesia, the level of sugarcane production is still 6.5-6.7 tons per hectare (Hanafi, 2013).

One of the constraints of sugarcane seeding using the bud chips method is the growth of roots and shoots that are not uniform and rather slow in bud chips originating from the middle of the stem and the growth of the tillers is still small. difficult. Based on some of the problems mentioned above, technology for preparing seeds that is short, does not take up space and of course is of high quality. The nursery technique that can produce high quality seedlings and does not require seed preparation through tiered gardens is the bud chips nursery technique. Bud chips are a vegetative sugarcane nursery technique that

uses one eye seed (Putri et al., 2013).

Bud Chips nurseries use one bud which is sown first on dederan media, after 15 days of age or ± 2 helicopters and then transplanted into a pottray or polybag nursery. Some of the advantages when a nursery uses polybags for cultivation include: Polybags are very good for drainage and aeration so that plants can thrive like land (Balit Sembawa, 2009).

METHOD

The research was conducted from October 2016 to December 2016 and took place in Purwoasri Village, Purwoasri District, Kediri Regency, East Java. Upper stem (eye number 1–3), middle stem (eye number 4–7), and rootstock (eye number 8–11) of the Bululawang variety aged 6–7 months, Atonic growth regulator with a concentration of 1 ml / liter of water, Dithane fungicide with a concentration of 1 g / liter of water, Marsal insecticide with a concentration of 1 ml / 10 liters of water, sterile planting media (soil: sand: compost with a ratio of 1: 1: 1) and water. The tools used in the implementation of the research include tubs, waring sacks, soil sieves, hoes, drill tools for Bud chips, and Hot Water Treatment tools, soil steam tools, trey pots, hoses, scissors, mulch, label boards, bamboo, rulers, tools. write, and a camera.

RESULT AND DISCUSSION

The analysis of variance (Appendix 2) shows that there is a very real interaction between the hot water immersion treatment and the use of parts of the sugarcane stalks when germinating. Hot water immersion treatment on rootstock for all immersion time resulted in longer germination time than other treatments and it was not significantly different. The treatment of hot water immersion on the scion for 60 minutes showed significantly faster germination time and was not significantly different from that of hot water immersion in the scion for 30 minutes. The results of the analysis of variance showed that there was a very real interaction in the combination treatment of hot water immersion and using parts of sugarcane stalks on the percentage of germination. Hot water immersion treatment on the scion for 60 minutes (B1W5) gave a higher germination percentage, and was not significantly different from B1W1, B2W1, B3W1, and B3W2. Soaking hot water on the scion for 15 minutes (B1W2) and treatment of the middle stem for 45 minutes (B2W4).

The results of the analysis of variance showed that there was a very significant interaction between the hot water immersion treatment and the use of parts of the sugarcane stems on plant height. At the age of 30 DAS, 45 DAS, 60 DAS, 75 DAS and 90 DAS, hot water immersion in rootstocks for 0 minutes (B3W1) resulted in the lowest plant height compared to other treatments. In general, the hot water immersion treatment at the upper limit for 15 minutes (B1W2) was not significantly different from the hot water immersion treatment at the middle limit for 45 minutes (B2W4), and produced the highest plant height compared to other treatments. The results of the analysis of variance showed that there was a very real interaction between the hot water immersion treatment and the use of parts of the sugarcane stalk. There was a number of leaves at the age of 30, 45, 60 and 75 days after planting, while at 90 days after planting there was no significant effect. At the age of 30 DAS, 45 DAS, 60 DAS, 75 DAS and 90 DAS, hot water immersion in rootstocks for 0 minutes (B3W1) produced the least number of leaves from other treatments. In general, the hot water immersion treatment at the upper limit for 15 minutes (B1W2) was not significantly different from the hot water immersion treatment at the middle limit for 45 minutes (B2W4), and produced the highest number of leaves compared to other treatments.

The germinating time of the lower shoots in all treatments showed the longest immersion time compared to the shoots of the upper and lower stems. This is because the scion is a part of the stem that is younger and actively divides so that the buds are able to grow faster. Situmeang et al. (2015) added that the scion (shoot cuttings) is a merithematic part, which means that the cells in the tissue are very actively dividing so that shoots will appear and grow faster. In addition, it is also influenced by the high auxin content in the scion, which causes the apical dominant trait. According to Pawirosemadi (2011), apical dominance or shoot dominance is an event where the highest auxin content is in the meristimatis, especially on the scion. The auxin hormone which is synthesized in the scion will be transported basipetally (from the shoot to the base) to the part of the stem below it. Therefore, germination tends to occur more rapidly in apical shoots (top stem) than in lateral shoots (middle and lower stems), or it can be said that the shoots below will become dormant. The germination phase is the starting point or critical period of the life of the sugarcane plant that determines the good or bad of the next stage of growth. This

germination phase lasts 4-6 weeks. In relation to seed germination, the thing that needs to be considered is the percentage of germination. The percentage of germination or germination is the percentage of the number of eyes that germinate in a day (Khuluq and Hamida, 2014).

In the variable percentage of germination, the treatment of hot water immersion on the scion for 15 minutes and soaking in hot water on the middle stem for 45 minutes significantly resulted in a higher germination percentage than other treatments. Marthen and Rehatta (2013) state that soaking hot water can accelerate the imbibition process because it can exert pressure for water to enter the shoots. In plants, the germination process will not occur if water has not been absorbed into the buds. The treatment of hot water immersion will cause the skin that protects the buds to be permeable to water and the entry of oxygen. Water is needed in the process of skin fracturing, embryo development and enlargement of cells at the point of growth. Water is also able to affect the activity of the alpha amylase enzyme. This enzyme will break down the carbonhydrate into glucose in dissolved form which will be translocated to the growing point so that it can stimulate certain hormones in plants until the germination process occurs. This hormone is often used to stimulate and even inhibit growth. The upper stem (apical shoot) produces the hormone auxin which is higher than the middle stem and rootstock. The auxin is channeled to the lower part of the plant and causes the growth of the bud underneath to be inhibited, or it can be said that the different buds below will become dormant. In this condition, the above eye will germinate earlier than the lower germination rate than the other treatments. The nature of apical dominance causes the dormancy period on the rootstock to be longer at the shoots below it. In the treatment of the scion and soaking time for 15 minutes and the treatment of the middle stem and soaking for 75 minutes, the combination of treatments that produced the highest plant height and number of leaves. Plant height is a plant size that is often observed both as an indicator of growth and as a parameter used to determine environmental influences or the effects of a given treatment. According to Ekosari (2009), the increase in plant height is the result of the process of increasing the size of plant cells both in size and cell length and the number of cells that increase due to active division. Plant height has a positive correlation with the number of leaves. As the number of leaves increases, the space for photosynthesis increases so that the resulting photosynthate increases. Furthermore, the photosynthate will be distributed to plant vegetative organs which will stimulate cell elongation activity which is able to stimulate the growth of plant parts, one of which is the stem. In the stem, almost 80% of the carbohydrates resulting from photosynthetic assimilation are stored (Pawirosemadi, 2011). Stems are a means of transporting water and dissolved minerals from roots to leaves and photosynthesis from leaves to other parts. If the number of leaves increases, the growth of stems and other parts of the plant will increase.

CONCLUTIONS

Based on the research results, the conclusion can be concluded that: The combination of B1W5 treatment is the treatment that gives the fastest germination day, namely 2.24 days, while the combination of B3W1, B3W2, B3W3, B3W4, and B3W5 treatments is the treatment that causes the longest germination days. The lowest yield of the germination percentage variable was given by the B1W5 treatment combination, namely 61.33%, while the best germination percentage was given by the combination of B1W2 and B2W4 treatments with the numbers 100.00% and 98.67%. The best variable of plant height and number of leaves was given by the combination of treatment B1W2 and B2W4, while the lowest was given by the combination of treatment B3W1.

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