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Growth Response and Production of Sabrang Onion (Eleutherine Bulbosa (L) Merr.) on Weeding and Biochar Application

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ABSTRACT

This research was conducted at the Faculty of Agriculture's Screen House, University of Sumatera Utara with an altitude of + 25 meters above sea level, from March to May 2018. The research used randomized block design (RBD) with 2 factors. Factor I was weeding with 3 different times, namely: P0: control (without weeding), P1: once every 7 days, P2: once every 14 days. Factor II was the provision of biochar with 3 levels, namely B0: 0 (without biochar), B1: 20 tons / ha = 1 kg / plot, B2: 40 tons / ha = 2 kg / plot. The results of statistical analysis showed that Sabrang onion plant growth significantly affected by the weeding treatment and biochar Application, i.e. leaf sprouting age and interaction of both significantly affected the leaf area and tuber fresh weight / plot. Weeding once in 14 days was the best treatment, while the treatment of 10 tons of biochar / ha application was the best treatment.

Keywords: growth response, production**,** sabrang onion, biochar, weeding.

INTRODUCTION

The use of traditional medicine is growing rapidly lately. This development is supported by the tendency of humans to treat naturally or back to nature. Traditional medicine is considered more practical because it has been going on for generations. One of the medicinal plants that have been developed especially in the area of Kalimantan Tengah is the sabrang onion plant (Eleutherine bulbosa (L) Merr.). This plant has many types with different shapes and types such as onions, garlic and various other types of onions. The specific characteristics of this plant are red-colored plant tubers with a very slippery surface. The leaves are paired with the composition of double-finned leaves. The bone leaf type is parallel with slippery leaf edge and ribbon-line leaf shape. Besides being used as a medicinal plant this plant can also be used as an ornamental plant because the flowers are beautiful with an attractive white color (AIAT, 2010).

Judging from its chemical content, the potential of Dayak onion tuber as a multifunctional medicinal plant is very large. Its use as an additional ingredient in cooking is also increasingly popular. However, research on dayak onion tuber has not been widely carried out, especially related to its efficacy as an antimicrobial. Empirically, dayak onion tuber are known to have properties for treating boils or skin diseases. The way to use it is by attaching the grated of dayak onion tuber on the injured area (Galingging, 2009).

Weeding is an activity to remove weeds that are between the sidelines of agricultural crops and at the same time to loosen the soil. The purpose of weeding is that the main crops on agricultural land are not disturbed by other plant vegetation which is often referred to as weeds, so that the factor of nutrient competition between the main plants and weeds is reduced (PPP, 2015).

The long-term benefits of biochar applications for plant nutrient availability

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are related to higher stabilization of organic carbon than organic materials commonly used in agricultural cultivation. In addition, a long period of persistence on the soil also makes biochar worthy of being chosen to reduce the effects of global warming. Availability of sufficient nutrients for plants is the impact of the increasing nutrients directly from biochar and the increasing nutrient retention, in addition to changes in soil microbial dynamics (Rondon et al., 2007).

Based on the description above, the writer was interested in conducting a research entitled: Growth Response and Production of Sabrang Onion (Eleutherine Bulbosa (L) Merr.) against Weeding and Biochar Application

MATERIALS AND METHODS

This research was conducted at the Faculty of Agriculture's Screen House, University of Sumatera Utara at the altitude of ± 32 meters above sea level from March to May 2018. The material used in this research was sabrang onion seed; A1 variety and biochar; rice husk. The tools used in this research were analytical scales and basic fertilizer of N (ZA), P (SP-36), and K (KCl) according to the recommended dosages of 20 tons / ha (720 g), 15 tons / h (540 g) and 10 tons / ha (360 g). This research used a randomized block design (RBD) with 2 factors where the Factor I was weeding with 3 different times, namely P0: control (without weeding) P1: once every 7 days, P2: once every 14 days and Factor II was Biochar with 3 levels, namely; B0: 0 (without biochar), B1: 20 tons / ha = 1 kg / plot and B2: 40 tons / ha = 2 kg / plot.

The planting area used for this research was 4 x 10 m wide. The 4 x 10 m land area was formed into 27 plots, in which 1 block consists of 9 plots. One plot was 60 cm x 60cm size, with each 30cm trench.

After the plot was formed, each plot was added with 20 kg of top soil. Then the soil pH was calculated for each plot. Sabrang onion planting was carried out with a spacing of 15 x 15 cm, with 2 planting holes tubes where the tubers have been cut at the upper-base of one-third part.

Harvesting was done after the plant tubers appear on the soil surface and the flowers have bloomed 70% in the entire plot of the plant. Harvesting was done by removing the tubers using a shovel and sickle, and the harvested tubers were cleaned from the soil.

RESULTS AND DISCUSSION

Age of sprouting of Sabrang Onion

Weeding treatment and biochar application have a significant effect on the age of sprouting but the interaction is not real.

The results of statistical data analysis showed that the frequency of weeding significantly affected the leaf sprouting period. This was allegedly because in the vegetative phase plants can grow well. This was in accordance with the literature of Zainab (2010) which stated that in the vegetative phase the plant is in dire need of nutrients for the plant itself in order to meet the needs of the plant body in order to grow and develop such as forming leaves, new branches, tillers and producing. If the plant is disturbed by other plant populations or weed conditions that never been weeded, then there will be a seizure of nutrients so that the growth and development of the plant is hampered.

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Table 1. The Age of Sabrang Onion Sprouting on Weeding Treatment and Biochar Application.

Application	B0 (0 ton)	B1 (20 tons/ha)	B2 (40 Tons/ha)	Average
P0	3.16	2.5	2.58	2.75a
P1 (7 days onces)	3.08	2.08	2.16	2.44b
P2 (14 days onces)	3.00	2.00	2.16	2.38b
Average	3.08a	2.19ab	2.30ab	

Note: Numbers followed by the same notation in the same row and column showed no significant difference according to the Duncan's Multiple Range Test (DMRT) at 5% level

Leaf area of Sabrang Onion

The results of statistical data analysis showed that the interaction of weeding and biochar treatment had a significant effect on leaf area treatment. This is presumably because in the vegetative phase the plant is able to grow well. This is in accordance with the literature of Arve et al, (2011) which states that in the vegetative phase the plant really needs nutrients for the plant itself in order to meet the needs of the body in order to grow and develop such as forming leaves, new branches, tillers and can produce.

Table 2. Average Area of Sabrang Onion Leaves on weeding treatment and biochar application.

Application	B0 (0 ton)	B1 (20 tons/ha)	B2 (40 Tons/ha)	Average
P0	4.77e	56.89d	55.44d	53.37
P1 (7 days onces)	54.04d	67.4b	62.16c	61.2
P2 (14 days onces)	55.68d	70.35a	64.12bc	63.28
Average	52.5	64.88	60.57	

Note: Numbers followed by the same notation in the same row and column showed no significant difference according to the Duncan's Multiple Range Test (DMRT) at 5% level

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Fresh tube weight

The results of statistical data analysis showed that the interaction of weeding treatment and biochar application significantly affected the treatment of tuber fresh weight per plot. This was allegedly because the frequency of weeding provided an effect where the plants are able to grow well and compete in the struggle for nutrients.

This was suspected because the frequency of weeding minimized the seizure of nutrients between the main plants and weeds and reduced the competition of sunlight penetration. But in some plants, some do not need too much sunlight; such as chamaedorea palm and requires quite high moisture in the soil such as sabrang onion so weeding is better rarely done because weed leaves can cover the soil so that the soil becomes moist and if weeds around the tuber were too often weeded then the moisture in the soil will trigger the soil to be attacked by fungi so the tubers can rot besides that weed roots will damage the roots of sabrang onion tubers if weeding is done too often. This is in accordance with Tenaya's literature (2015) which stated that weeding reduces the competition for nutrient absorption and reduces the competition for sunlight penetration.

Cultivated plants must get all the nutrients and water provided by farmers to be able to produce optimally. Haryati et al, (2010) showed that the interval of water supply every 4 days tended to produce heavier tubers weight per plant compared to other water supply intervals (1 day, 2 days and 3 days). Putri et al, (2017) moisture in the soil can trigger the growth of fungi and pathogens. This was presumably because biochar can maintain soil moisture and provide faster N and P uptake and increase P available in soil so that when the plant enters the generative period the plants will be more maximal in the formatting the tubers because P nutrients can stimulate the assimilation process in the plants so that the assimilation results will be more optimal and stored well in the tubers so that the tubers will be larger.

Table 3. Average rate of tuber fresh weight of sabrang onion per plot on weeding treatment and biochar application.

Application	B0 (0 ton)	B1 (20 tons/ha)	B2 (40 Tons/ha)	Average
P0	22.74d	30.42c	27.80cd	26.99
P1 (7 days onces)	24.58d	40.7ab	33.71c	33
P2 (14 days onces)	24.31d	45.18a	38.14b	35.88
Average	23.88	38.77	33.22	

Note: Numbers followed by the same notation in the same row and column showed no significant difference according to the Duncan's Multiple Range Test (DMRT) at 5% level

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CONCLUTIONS

Weeding treatment significantly increased the growth and production of sabrang onions on all observed variables. Treatment Weeding every 14 days is the best treatment. The treatment of giving biochar significantly increased the growth and production of sabrang onions on all observed variables. Giving biochar 20 tons/ha is the best treatment.

The interaction of weeding treatment and the provision of biochar significantly increased the growth and production of sabrang onions on all observed variables except age of budding. The interaction of weeding once every 14 days with the provision of biochar 20 tons/ha is the best treatment.

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