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Research Paper

Growth and Yield of Sweet Sorghum (*Sorghum bicolor* L. Moench) Planted in Tidal Soil Applied with Dolomite and Vermicompost

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Abstract
Sorghum (*Sorghum bicolor* L. Moench) plant is native to tropical and subtropical countries with high suitability for planting on marginal land. Therefore, this research aimed to determine the use of dolomite and vermicompost in tidal swamp soil for the growth and yield of sweet sorghum plants at the Experimental Garden and the Chemistry, Biology and Soil Fertility Laboratory, Department of Soil Science, Faculty of Agriculture, Sriwijaya University. A factorial randomized complete block design (FRCBD) consisting of two factors was used. The first factor was dolomite namely 0 ton.ha^{-1}, 6 ton.ha^{-1}, 9 ton.ha^{-1}, and 12 ton.ha^{-1}, while second factor was vermicompost including 0 ton.ha^{-1}, 3 ton.ha^{-1}, 6 ton.ha^{-1}, and 9 ton.ha^{-1}. The results showed that the application of Dolomite had a very significant effect on soil pH, N-total, P-available, and potassium exchangeability. In addition, dolomite increased plant height, number of leaves, chlorophyll content, fresh and dry weight shoot, number of grains, and weight of 1000 grains.

Keywords
Dolomite, Sorghum, Tidal swamp, Vermicompost

1. INTRODUCTION

Sorghum (*Sorghum bicolor* L. Moench) plants are native to tropical and subtropical countries in the southeastern Pacific and Australasia, namely Australia, New Zealand and Papua. This plant is tolerant to drought and does not require a lot of water during the growth period. In addition, sorghum is considered suitable for growing on marginal land and is tolerant to environmental stress. A superior variety is the Bioguma 3 agritan cultivar, which can also produce ratoons and can grow to a height of 254 cm (Lestari, 2019). Bioguma 3 agritan variety has a 50% flowering age of around 61 days and a harvest age between 91 and 105 days. Efforts need to be made to develop swamp land to keep pace with population growth. On a national scale, swamp land plays a role in agricultural development efforts, especially in support of national food security. Indonesia has tidal swamp land covering an area of 20.1 million ha with a potential land typology of 2.1 million ha, acid sulfate 6.7 million ha, peat 10.9 million ha, and saline area of 0.4 million ha. In the future use of tidal swamp land, development is needed to increase agricultural production (Susilo et al., 2019). Peat soil has a low pH level, high cation exchange capacity, low base saturation, low K, Ca, Mg, P content and also low micronutrient content (such as Cu, Zn, Mn and B). Addition of nutrients to peat soil can increase plant growth and development (Baharuddin and Sutriana, 2019). Vermicompost is an organic fertilizer that comes from a mixture of earthworm faeces and organic materials subjected to a composting process using worms (Dhani et al., 2014). The provision of 4 tons/hectare of vermicompost increases sweet corn yields (Dailami et al., 2015). In addition, the application of dolomite can increase soil pH in swamp land and improve other chemical properties (Paripurna et al., 2017). According to Susilo et al. (2019), optimal soil pH for growing sorghum is 6.0 – 7.5. In swamp soil, the pH is usually below 5 and the low pH can reduce sorghum yields by 10%. Therefore, this research aimed to determine the efficiency of dolomite application in improving soil chemical properties, adding vermicompost fertilizer to increase sorghum production in swampy soil and observing the interaction.

2. EXPERIMENTAL SECTION

2.1 Material and Method

This research was carried out in 2020 at the Experimental Garden, Faculty of Agriculture, Sriwijaya University