

## ABSTRACT

### ***THE EFFECT OF SOIL TILLAGE AND FERTILIZATION ON YIELD AND NUTRIENT UPTAKE (C, N, P, AND K) IN SORGHUM (*Sorghum bicolor* L. Moench) CROP ON ULTISOL GEDUNG MENENG IN THE 7th GROWING SEASON.***

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*Sorghum (*Sorghum bicolor* (L.) Moench) is one of the cereal crops with significant potential as an alternative food and feed source. Due to its high adaptability, sorghum is potential cultivated in Indonesia. One of the efforts to increase yield sorghum is the application of appropriate soil tillage techniques and fertilization to optimize nutrient uptake by the plants, thereby maximizing crop productivity. This research aimed to determine the effects of soil tillage and fertilization on sorghum yield and nutrient uptake (C, N, P, and K) in sorghum plants. The study was designed using a Randomized Complete Block Design (RCBD) with two factors and 4 replications. The first factor is the soil tillage system, consisting of minimum tillage (O1) and intensive tillage (O2). The second factor is fertilizer application, comprising of half the recommended dose (P1) and the full recommended dose. The data obtained were analyzed for homogeneity of variances using the Bartlett test, and data additivity was tested using the Tukey test. The data were then subjected to Analysis of Variance (ANOVA) and followed by a Tukey's Honestly Significant Difference (HSD) test at a 5% significance level. The results of this research indicate that minimum tillage significantly*

*increased the carbon (C) content in sorghum shoots compared to intensive tillage. Full-dose fertilizer application (chicken manure 1000 kg ha<sup>-1</sup>, Urea 350 kg ha<sup>-1</sup>, TSP 80 kg ha<sup>-1</sup>, KCl 150 kg ha<sup>-1</sup>) was able to enhance yield (shoot weight and spikelet number), potassium (K) content in shoots, total K in sorghum plants, nitrogen (N) content in shoots, spikelet N, phosphorus (P) content in shoots, carbon (C) content in shoots, C content in spikelet as well as the total C in sorghum plants compared to half-dose fertilization (chicken manure 500 kg ha<sup>-1</sup>, Urea 175 kg ha<sup>-1</sup>, TSP 40 kg ha<sup>-1</sup>, KCl 75 kg ha<sup>-1</sup>). There was no significant interaction effect between soil tillage and fertilization treatments on sorghum yield. However, there was an interaction effect between soil tillage and fertilization treatments on N uptake in shoots and sorghum seeds.*

*Keywords: fertilizer, nutrient uptake, soil tillage*

## ABSTRAK

### **PENGARUH OLAH TANAH DAN PEMUPUKAN TERHADAP PRODUKSI DAN HARA TERANGKUT (C, N, P DAN K) PADA PERTANAMAN SORGUM (*Sorghum bicolor* L. Moench) DI TANAH ULTISOL GEDUNG MENENG PERIODE TANAM KE-7**

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Tanaman sorgum (*Sorghum bicolor* (L.) Moench) merupakan salah satu jenis tanaman serealia yang mempunyai potensi besar sebagai sumber pangan dan pakan alternatif. Karena mempunyai adaptasi yang tinggi, sorgum cocok dibudidayakan di wilayah Indonesia. Salah satu upaya untuk meningkatkan produksi sorgum yaitu dengan penerapan teknik olah tanah dan pemupukan yang tepat guna mengoptimalkan unsur hara yang terangkut oleh tanaman dan produktivitas tanaman sorgum. Penelitian ini bertujuan untuk mengetahui pengaruh pengolahan tanah dan pemupukan terhadap produksi dan hara terangkut (C, N, P, dan K) pada tanaman sorgum. Penelitian ini dirancang menggunakan Rancangan Acak Kelompok (RAK) yang menggunakan dua faktor dengan 4 ulangan. Faktor pertama yaitu sistem olah tanah terdiri dari olah tanah minimum (O<sub>1</sub>) dan olah tanah intensif (O<sub>2</sub>). Faktor kedua yaitu aplikasi pupuk terdiri dari setengah dosis pupuk anjuran (P<sub>1</sub>) dan *full* dosis pupuk anjuran (P<sub>2</sub>). Data yang diperoleh dianalisis melalui uji homogenitas ragam menggunakan uji Barlett dan aditivitas data diuji dengan uji Tukey. Selanjutnya data dianalisis dengan Analisis Ragam dan dilanjutkan dengan uji BNT 5%. Hasil penelitian menunjukkan bahwa: (1) sistem olah tanah minimum nyata

meningkatkan kandungan C brangkasan tanaman sorgum dibandingkan sistem olah tanah intensif ; (2) aplikasi pupuk dengan dosis penuh (kotoran ayam 1000 kg ha<sup>-1</sup>, Urea 350 kg ha<sup>-1</sup>, TSP 80 kg ha<sup>-1</sup>, KCl 150 kg ha<sup>-1</sup>) mampu meningkatkan produksi (bobot brangkasan dan jumlah malai), kandungan K brangkasan, K total tanaman, N brangkasan, N malai, P brangkasan, C brangkasan, C-malai, serta kandungan C total tanaman sorgum dibandingkan dengan pemupukan dosis setengah (kotoran ayam 500 kg ha<sup>-1</sup>, urea 175 kg ha<sup>-1</sup>, TSP 40 kg ha<sup>-1</sup>, KCl 75 kg ha<sup>-1</sup>); (3) tidak terdapat pengaruh interaksi antara perlakuan olah tanah dan pemupukan terhadap produksi tanaman sorgum, namun terdapat pengaruh interaksi antara perlakuan olah tanah dan pemupukan terhadap N terangkut brangkasan dan N terangkut biji tanaman sorgum.

**Kata kunci:** hara terangkut, olah tanah, pupuk.