

## ABSTRACT

Paddy is the main food crop that produces rice and is consumed by the majority of Indonesian people. The conversion of fertile irrigated agricultural land for non-agricultural purposes is one of the main factors contributing to the decline in crop yields. Therefore, efforts in soil and water conservation are necessary to prevent soil erosion, rehabilitate damaged soil, and maintain and improve crop productivity. One such method involves tillage systems and the application of mycorrhizal biofertilizers. The objectives of this study are to understand the tillage system and the effects of mycorrhizal biofertilizer application on the growth, agronomic characteristics, and yield of rice. This research was conducted in Paloh Lada Village, Dewantara Subdistrict, North Aceh Regency, and in the Agroecotechnology Laboratory, Faculty of Agriculture, Malikussaleh University, from August to December 2024. The study used a Split Plot Design with two factors and three replications. The first factor as the main plot was tillage (T), consisting of three treatments: T0 (No Tillage), T1 (One-time Tillage), and T2 (Two-time Tillage). The second factor as the subplot was mycorrhiza (M), consisting of three treatments: M0 (0 grams/plant), M1 (10 grams/plant), and M2 (15 grams/plant). The results of the study of the two-time tillage system were able to increase growth and yield components in leaf area variables at 50 HST, leaf area index at 50 HST and harvest age, root length at 20 HST, root fresh weight at 30 HST, plant fresh weight at 30 HST, root dry weight at 30 HST, plant dry weight at 30 HST and grain yields of tons/hectare reached 4.23 tons/ha. The provision of 15 g/plant mycorrhiza increased growth and yield components in plant height variables at 20 HST, number of tillers at 20 HST, leaf area index at 20 HST, number of leaves at 20 HST, root length at 50 HST and harvest age, root fresh weight at 30 HST, and root dry weight at 30 HST. The combination of the tillage system and mycorrhizal biofertilizer had a very significant effect on the number of tillers and the number of leaves. The best combination is shown in T1M2 (one tillage and 15 grams of mycorrhiza/plant).

**Keywords:** *Root, grain, combination, processing, growt.*