

ABSTRACT

Rice (*Oryza sativa* L.) is one of the staple food sources for the Indonesian people and contains a high amount of carbohydrates. Improving the growth and yield of rice plants is necessary to meet the growing demand. One method to achieve this is through soil management and the application of nutrients via fertilizers, including biofertilizers, organic, and inorganic fertilizers. This study aims to examine the effects of tillage systems and mycorrhizal biofertilizers, as well as their combination, on the physiological characteristics and yield of rice. The research was conducted in Palo Lada and at the Agroecotechnology Laboratory, Faculty of Agriculture, Malikussaleh University from August to December 2024, using a Split Plot Design with two factors and three replications. The first factor, as the main plot, was tillage (T). The second factor, as the sub-plot, was mycorrhiza (M). The results showed that the tillage system had a significant effect on variables such as leaf area, root volume at 50 Days After Planting (DAP), fresh root weight at 30 DAP, dry root weight at 30 DAP, root length at 20 DAP, shoot-root ratio at 40 and 50 DAP, net assimilation rate, relative growth rate, plant dry weight at 30 DAP, grain weight per plot, and grain yield (tons/hectare). Application of mycorrhizal biofertilizers significantly affected leaf chlorophyll content, root volume at 30 DAP, fresh root weight at 30 DAP, dry root weight at 30 DAP, root length at 50 DAP and at harvest, and the level of root infection. The combination of tillage systems and mycorrhizal biofertilizers had a highly significant effect on leaf chlorophyll content. Further research is needed to explore the physiological characteristics and yield of rice under different tillage systems and applications of mycorrhizal biofertilizers.

Keywords: *carbohydrate, processing, root, grain, dan growth*