

Field performance of a single chassis integrated machine system in planting oil palm seedlings

ABSTRACT

Current technique and technology employed for new planting and replanting of oil palms by the plantation industry in Malaysia are very laborious and time consuming. The whole planting operation involves many individual activities that were carried out in a staggered manner within a certain time involving different groups of workers. A single chassis integrated, self propelled, wheeled type machine system has been designed, developed, and tested to overcome such problem in the oil palm plantation. This two-man operation machine system integrates 6 individual activities in the planting operation within a single machine pass. The complete machine system consists of a universal prime mover that carries at the back a transplanter unit having a seedling bin, support sleeves, planting assembly, operator compartment and hydraulic system. Field evaluation and testing with the machine system shows that this mechanized planting system resulted with a planting capacity of 120 seedlings man⁻¹ day⁻¹ or 0.75 ha man⁻¹ day⁻¹, human energy inputs of 7.90 Kcal min⁻¹ man⁻¹. Assessment on the planting quality of the planted seedling shows planting success of 99.25±0.28%, leaning angles of 86.04±0.29 degree, spacing deviations of 5±4.14 cm, row alignments of 4.55±0.24 cm, and pulling forces of the planted seedlings of 380.8±23.72 N. As a conclusion, an increased in the planting capacity per man-day of 2.67 times and a reduction of human energy per min-man-day of 2.16 times were obtained with this mechanized system compared to the commonly employed manual method in the oil palm plantation.

Keyword: Mechanised planting; Seedling planting; Planting machine; Oil palm cultivation