

Mechanised weed control applicator for mature oil palm

ABSTRACT

A new machine system has been designed, developed and evaluated for extensive weed control around mature oil palm. The machine system consists of a 4WD prime mover with the front mounted machine attachments for circle spraying operation. The configuration of the circle spraying attachment consists of the hexagonal curved spray boom, lifting arm, opening-tilting mechanism unit, storage tank, spray pump, solid cone nozzles, and associate hydraulic system. Field performance tests on the machine system showed an average effective field capacity of 7.89 ha per manday and when compared against the earlier reported effective field capacity of the walking spray-operated equipment using rechargeable battery powered knapsack sprayer, there was a difference of 1.97 times for circle spraying of mature palms grove. A reduction in the human energy expenditure of 24.19 kcal per manhour or 10.68 per cent but an increase in the spraying cost per hectare of USD 1.53 per hectare (RM4.66/ha) or 24.9 per cent were obtained with the machine system against the walking spraying-operated equipment using rechargeable battery powered knapsack sprayer. Justification for machine system to be cost effective could be satisfied if the present effective field capacity is increased to 26.3 per cent with a good skilled operator or if the current R&D cost is reduced to 0.41 times. This is because the improved field capacity of the new machine system could not rationalise its current R&D cost. Admittedly, the machine system has great potential to overcome the limitations with the currently employed machine/equipment in the circle spraying operation of oil palm in the plantation.

Keyword: Circle spraying; Oil palm cultivation; Agricultural machinery; Mechanisation