

EVALUATION OF COMPARATIVE PERFORMANCES OF NEWLY DESIGNED LOWLAND POWER WEEDER

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Weed control is one of the most difficult tasks in rice cultivation that accounts for a considerable share of the cost of rice production. The chemical method of weed control is more prominent than manual and mechanical methods. However, its adverse effects on the environment are making farmers to consider and accept mechanical methods of weed control. Although rice transplanters, seeders and harvesting machineries were well developed as a step for mechanization; weeding is not yet properly mechanized in Sri Lankan conditions. Hence, Faculty of Agriculture, Rajarata University of Sri Lanka has designed and fabricated lowland power weeder for medium and large scale farmers. However, it is not evaluated properly. Therefore, this study was aimed to compare the performance of newly designed lowland power weeder with existing paddy weeders. RNAM (Regional Network for Agricultural Machinery) test codes and procedures was followed for the comparison of existing weed control as six treatments; T₁- Control, T₂- Manual, T₃- Conoweeder, T₄- Asakura wooden clog, T₅- Japanese rotary power weeder, and T₆ - Newly designed power weeder in RCBD design with four replicates. The overall dimensions and the weight of the newly designed machine were 150 x 80 x 78 cm and 62.85 kg, respectively. It showed satisfactory field performances such as; 9.3 m/min traveling speed, 4.3 cm depth of cut, 0.04 ha/hr field capacity, 60% field efficiency, 70% covered width percentage, 62.3% weeding efficiency, 1% plant damage, 24.98 man-hr/ha labour requirement, Rs. 5944 cost of weeding per ha, and 12 maximum tillers per hill and 4158 kg/ha paddy yield in average field conditions. When comparing weeding methods on weeding efficiency and maximum tiller number, newly designed power weeder showed significantly highest performance than other weeding methods ($p < 0.05$). However, it got second rank from depth of cut, field capacity, field efficiency, covered width percentage, labour requirement, cost of weeding, paddy yield and third rank form traveling speed. There was no significant treatment effect on plant damage percentage. On the other hand, any ergonomics defects form this machine were not reported. Thus this machine could be introduced as appropriate weeding machinery for medium and large scale paddy farmers of Sri Lanka. However, the comparatively higher total weight is difficult to handle in lowland field conditions. Therefore, it is suggested to utilize low weight materials and components.

Keywords: Comparison of weeders, Field performance, Power weeder, Weed control, Weeder evaluation