**ABSTRACT**

Labor scarcity is becoming a serious problem in rice cultivation in Sri Lanka and Mechanical Transplanting (MT) can be considered as one of the feasible solutions. MT using automated walk behind type transplanter has been introduced to Sri Lanka 3 – 4 years back, but experimental information related correct seeding rates to be used in nursery trays to obtain vigorous seedlings to transplant in MT is still lacking.

Two field experiments were conducted (i) to determine the optimum seeding rate for MT and (ii) to compare the selected seedling rate for MT with recommended establishment methods. In experiment (i), four seeding rates (75g/tray, 100g/tray, 150g /tray, 200g/tray) were tested using two varieties (Bg 360 and Bg 374). Experiment (ii) compared MT with broadcasting (BC) and parachute method (PA). Considering seedling height, total root length, seedling dry weight and cost effectiveness 100 g/tray and 150 g/tray were selected as the optimum seed rates for Bg 360 and Bg 374 respectively. The seed rate had a strong correlation with the total root length, seedling height and dry weight.

Establishment method had a significant impact on seedling height, total root length and seedling dry weight. The seedlings produced by MT were comparatively less in seedling height, total root length and dry weight compared to the PA but higher than RT. The ground cover % and number of plants per square meter in MT were less comparatively to the RT, PA, BC but irrespectively produced significantly higher number of tillers/m2. By considering the plant growth parameters at vegetative phase, optimum plant spacing and better placement of seedlings by the transplanter gives plants with significantly higher growth rate compared to the conventional RT. Identification of the correct seeding rates for the nursery trays in MT is having a good potential for achieving the sustainability of Rice production in Sri Lanka.