**ABSTRACT**

High labor intensity, delayed transplanting and low plant population due to improper transplanting are the major causes for low rice (*Oryza sativa L*.) yields in Sri Lanka which can be optimized by using Mechanical Transplanting (MT) as the most feasible solution. The optimum seed rate for nursery had become a critical factor as the main object of MT is faster operation avoiding missing hills. Low technical information about the correct seed rates to be used in nursery trays under Sri Lankan conditions as introduced recently.

Two field experiments were conducted to determine the optimum seed rate for MT and to compare its seedling vigor and early plant growth with other establishment methods. Two varieties (Bg 374 and Bg 360) were tested separately with 4 seed rates for nursery trays (75 g/tray, 100 g/tray, 150 g/tray, 200 g/tray). According to the seedling growth parameters seedling height, total root length, seedling dry weight the vigorous seedlings were produced at low seed rates of both varieties. 100 g/tray and 150 g/tray were selected as the optimum seed rates for the varieties Bg 360 and Bg 374 considering the seedling vigor and cost effectiveness.

The MT transplanting with optimum seed rates in both varieties were compared separately with the Broadcasting (BC), Random Transplanting (RT) and Parachute method (PA) during the nursery stage and early plant growth after field established. There was a significant impact on the seedling growth parameters including seedling height, total root length, seedling dry weight from the method of establishment. MT produced comparatively less vigor seedlings than the BC and PA, but higher than the RT. MT produced comparatively low Ground Cover %, Plant height, low number of plants per square meter than the BC, PA and RT but had higher tiller density than the other establishment methods.

**Key words:** Mechanical Transplanting, Optimum Seed rate, Seedling vigor, Establishment methods