

DEPTH OF PLOUGHING ON GROWTH AND YIELD OF RICE IN DRY ZONE OF SRI LANKA

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Shallow preparation of paddy fields with rotavater attached to a two-wheel tractor forms shallow plough pan, which could affect growth and grain yield of rice. Assuming the deep ploughing would be able to solve these problems; this study was conducted to investigate the effect of depth of ploughing on growth and yield of rice (BG 300) in dry zone of Sri Lanka in *Yala* season at the faculty farm of Rajarata University of Sri Lanka at Anuradhapura. Three treatments were tested in randomized complete block design with 04 replicates. Treatments were; 10-20 cm depth of ploughing with rotavater attached to two-wheel tractor (control- T_1), 20-30 cm depth of ploughing with mould-board-plough attached to four-wheel tractor (T_2) and 30-40 cm depth of ploughing with disk-plough attached to four-wheel tractor (T_3). Both above and below ground growth parameters and penetration resistance at significant growth stages and yield and yield components at the maturity were measured. Treatment T_3 recorded the highest significant ($p < 0.05$) grain yield (4.64 t ha⁻¹), plant height at heading (81.7 cm), total root length (30940 cm) and average rooting depth (18 cm) compared to other treatments. Significantly high dried shoot and root biomass at the heading were also recorded in T_3 (189.7 and 17.5 g per plant respectively). Total number of tillers per six plants and leaf area index (LAI) at 50 % of flowering stage were significantly different among the treatments ($T_1 < T_2 < T_3$). Significant difference of soil penetration resistance was observed among treatments at post-ploughing and pre-flowering periods ($T_1 > T_2 > T_3$). In pre-ploughing and post-harvesting periods, insignificant variation of soil penetration resistance among the treatments was observed. Based on these results, it could be suggested paddy farmers in dry zone in Sri Lanka to adopt 30-40 cm depth of ploughing to obtain higher growth rate and yield of rice by maintaining the soil with less penetration resistance and better soil conditions for growth of rice plant throughout the growing season.

Key words: Growth, Ploughing depth, Rice, Soil penetration, Yield