

INVESTIGATING THE SALINITY TOLERANCE OF SELECTED NEWLY IMPROVED RICE VARIETIES IN SALT- AFFECTED ENVIRONMENTS: A CASE STUDY IN *HAMBANTOTA, SRI LANKA*

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Salinity threatens rice production, food security, and livelihoods in Sri Lanka. Developing resistant paddy varieties using traditional strains helps mitigate the issue. This study was conducted to assess the performance of selected rice varieties (traditional and improved new lines) in salinity-affected environments in *Hambantota* District, Sri Lanka. A pot experiment was conducted as per the CRD experimental design with three replicates in control environmental conditions at the Rice Research Station *Ambalanthota*, Sri Lanka. The pot experiment screened the salinity tolerance of selected four rice varieties namely At 18 1327, At 18 1548, At 18 2223, and *Pachchaperumal* at different salinity levels, 5, 4, 3, 2, and 1 ds/m. Two salinity-tolerant accessions (*Pokkali* and At 354) and a susceptible accession (*Bg 300*) were maintained as two control treatments. Thirty-day old seedlings of selected rice varieties were grown at different salinity levels. And vegetative growth performance (plant height (*PH*), number of tillers (*TN*), leaf number (*LN*), relative chlorophyll content (*RCC*) and days to flowering (*DF*) were observed. A significantly positive interaction ($p=0.05$) was detected between the variety and salinity levels. Data Analysis was done by using two-factor factorial CRD method. According to the results, *Pachchaperumal* elicited significantly higher resistance for the salinity due to better vegetative growth performance at the 8th week vegetative data. Based on overall vegetative performance, the newly developed At 18 1327 exhibited moderate salinity tolerance, whereas At 18 2223 displayed low resistance. Results demonstrated a significant reduction in all vegetative growth parameters with increasing salinity levels compared to normal soil conditions. Among the evaluated varieties, *Pachchaperumal* showed high salinity tolerance, while At-18 1327 and At 18 1548 exhibited moderate tolerance. Conversely, At 18 2223 was identified as salinity-sensitive. Findings suggest the potential for enhancing At 18 1327 and At 18 1548 through the integration of salinity-tolerant genes from *Pachchaperumal*.

Keywords: Food Security, Plant Breeding, Salinity, Salinity Resistant Rice, Traditional Rice