

EFFECT OF WATER STRESS ON THE GROWTH OF SELECTED RICE VARIETIES

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Drought stress induced by the deficit of water during the cultivation period is a major constraint to rice production and yield stability, especially under rain-fed conditions in the tropics, including Sri Lanka. Selection of varieties for drought resistance for plant improvement through breeding is given high priority in both national and international rice research programmes.

Our research aimed at screening for resistance to water-stress of some of the traditional as well as improved rice varieties available at the Plant Genetic Resources Centre, Peradeniya. The varieties used were *Hal al*, *Al wee*, *Batapola el*, *Goda heenati*, Bg 301 and Bg 380. From each variety, four replicates of seedlings were transplanted individually in polythene pots (1m depth x 20cm diameter) and grown under an artificial shelter at Meewathura. Plants were subjected to two different water deficiency treatments and a control. In the early-water deficient treatment, a long-term drought was induced after transplanting. In the late-water deficiency treatment, a short-term drought was induced where the plants were watered daily for seven weeks and left unwatered till harvesting. The control plants were watered daily until the time of harvest. Shoot height, number of green and dead leaves per plant, number of tillers and panicles per plant were recorded at weekly intervals. Shoot dry weight, root dry weight, root length and root: shoot ratios were recorded after harvesting. Statistical analysis was carried out using SAS (General Linear Model) program to determine the effect of the variety, water regimes and their interaction.

The results showed a significant difference in plant growth performance among the treatments and control. All the varieties reduced the number of green leaves under water-stressed conditions. The number of tillers per plant in *Hal al* was similar in both control and water-stressed conditions. In *Batapola el*, *Goda heenati* and Bg 301 both early and late water deficient treatments had similar number of tillers per plant. Panicle number per plant under water-stressed conditions was higher in *Al wee* followed by *Batapola el* and Bg 301. Root length increased under at least one water-stressed condition in *Batapola el*, Bg 380 and *Hal al* compared to that in the control, but not in *Al wee* and Bg 301. *Goda heenati* in contrast, reduced its root length with the induction of water-stress. The root dry weight was similar under both water-stress induced as well as control conditions in *Al wee*, *Batapola el* and Bg 380. In *Al wee* and *Batapola el* the root: shoot ratio increased under drought conditions over the control while it was similar and remained high under both conditions in Bg 380.

Of the six varieties examined, *Al wee*, Bg 301 and *Batapola el* were more tolerant of water-stress than the other three varieties under the experimental conditions. These varieties possess more adaptive features like a deeper root system, green leaf retention, production of tillers and panicles under stress than that of other three species. Bg 380 although developed a deeper root system under stress, it was unable to produce panicles under water-stressed conditions. Among all varieties studied, *Al wee* is the most tolerant of water-stress considering all the features examined in this study.