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SCREENING OF DROUGHT RESPONSIVE GENES OF RICE VARIETY Bg 358 THROUGH DIFFERENTIAL HYBRIDIZATION

**M. R. H. N. Ranasinghe¹, M. S. K. Amarakoon¹, D. M. De Costa¹
W. A. J. M. De Costa²**

¹*Department of Agricultural Biology, ²Department of Crop Science,
Faculty of Agriculture, University of Peradeniya*

Rice (*Oryza sativa*) is the most important staple food and a major source of energy for a large part of the world's human population, especially in East, South and South-East Asia. Drought or water deficit is one of the most severe limiting factors of plant growth and crop production and is responsible for dramatic reductions of rice yield.

In the present study, a previously prepared cDNA library from shoot tissues of a drought induced rice variety Bg 358, which was identified as a drought tolerant rice variety through physiological studies was used in screening for drought responsive genes. The cDNA library was subjected to differential hybridization using cDNA probes prepared from drought stressed and unstressed rice leaves.

Differential hybridization of 192 cDNA clones identified six up-regulated and 18 down-regulated genes due to drought stress. Out of the identified cDNA clones, seven up-regulated and three down-regulated cDNA clones were subjected to DNA sequencing. Subsequent DNA/protein homology search identified nine putative gene products namely ubiquitin conjugating enzyme E2, phosphoprotein phosphatase, stress-associated protein 8, protein phosphatase 1 and putative heat shock protein 82 as up regulated genes due to drought stress and serine/threonine protein kinase, putative transaldolase and MRG family protein as down-regulated genes due to drought stress in rice leaves of Bg 358. In addition, an up-regulated hypothetical protein was identified.

All the identified up-and down-regulated genes can be categorized into functional groups responsible for growth and development, protein and repair, energy and metabolism, protein synthesis, folding and stabilization and hypothetical protein. Out of the identified genes, 60% of the differentially-expressed genes belonged to the functional group of protein synthesis, folding and stabilization. Detailed information of genes identified as drought tolerant can be used as markers to screen drought tolerant rice varieties in breeding programmes.

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