

Lagenaria siceraria ring zinc finger 1 (LsRZF1)-antisense expression of transgenic watermelon rootstock improves drought stress tolerance in *Citrullus lanatus*

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Watermelon is a major fruit vegetable around the world. Drought is an abiotic stress factor that affects the productivity and growth of crop plants. To enhance the tolerance of watermelon to drought stress, it is important to isolate stress tolerance-related genes. Recently, we characterized the gene for ubiquitin E3 ligase protein named *Lagenaria siceraria* RING Zinc Finger 1 (LsRZF1). In *Arabidopsis*, LsRZF1 is involved in the drought response through the proline metabolism-mediated pathway. In this study, we identified and characterized a watermelon (*Citrullus lanatus* cv. Gongdae) homolog of LsRZF1, designated GdRZF1. LsRZF1 antisense (*lsrzf1*) transgenic watermelon lines showed decreased GdRZF1

expression and were in sensitive to drought stress than the wild type. Decreased expression of GdRZF1 was also significantly influential in changes in drought-sensitive parameters including relative water content, ion leakage, chlorophyll content, malondialdehyde levels, proline content and the expression of drought stress responsive genes. Additionally, grafted plants showed more health leaves and larger leaf area as compared with the control during drought condition. These findings results that GdRZF1 is important for water deficit tolerance in watermelon. This is the report of the development by genetic engineering of watermelon tolerance to drought response.