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Overexpression of *Arabidopsis* STH2 gene in transgenic rice Bg 250 enhances its productivity in T₀ generation

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Light is one of the most important factors that regulate plant growth and development. *Arabidopsis* STH2 protein can activate light dependent transcription and positively regulate light mediated development of plants. It has been shown that the productivity of crop plants might be enhanced by over-expressing central regulators of the light signaling pathway. To improve the productivity of Bg-250 Sri Lankan rice varieties by transforming STH2 gene, a simple and efficient *in vitro* plant regeneration protocol, and *Agrobacterium* mediated transformation protocol were successfully established. The over-expression data of *Arabidopsis* STH2 gene in indica rice variety Bg-250 is presented.

The Bg 250 rice variety was transformed with pPZP-STH2 recombinant construct using the above succeeded protocol. The Bg 250 was successfully transformed and transgenics were on soil until it produced seeds. The T₀ generation of Bg 250 putative transgenics were screened for the presence of the STH2 gene by PCR. PCR positive transgenics were further grown until they produced seeds. To check the expression of the trans gene in rice plants, transcript analysis was carried out with STH2 transgenic and non transgenic plants. Total RNA was isolated from genomic PCR positive four T₁ transgenic plants and RNA gel blot analysis was carried out. Total RNA isolated from non transgenic plants was used as the control. Compared to the control, T₁ generation Bg 250 transgenic plants showed a high level of expression of the STH2 gene.

Phenotypic studies of T₀ generation Bg 250 rice plants showed increased plant height, leaf length, leaf area and bushy appearance due to an increased number of tillers when compared with its non-transgenic control plants. Together these results demonstrated that the *Arabidopsis* STH2 gene in Bg 250 rice variety has considerable potential to modulate the rice plant architecture and its productivity in the T₀ generation. Overexpression of STH2 in rice plants can be directly related with phenotypic difference in transgenic plants.

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