Analysis of promoters in transgenic wheat

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The cereal grain is comprised of several tissue types and expressing transgenes in one or more tissue types will be crucial to use the cereal grain as a production platform to express transgenes for various uses. Use of biotechnology to improve the cereal grain for end-use quality or using it as a bioreactor has been amply demonstrated at least for the rice grain. Wheat is an important world food crop and improving it using a transgenic approach would require the use of specific gene/s but also the use of specific promoter elements to control the spatial and temporal expression of the gene/s. Use of one promoter to control expression of several transgenes in a specific plant tissue-type can lead to unpredictable transgene expression due to homology-based transgene silencing. We have studied the rice *Glutelin-B1* promoter, and the *barley alpha-amylase/subtilisin inhibitors* (*isa*) and the *B-hordein* (*B-hor*) promoters in transgenic wheat to investigate if specificity is maintained in a heterologous system. We also report the strength of these promoters to drive *gfp* expression in the wheat grain. Wheat promoters corresponding to the High Molecular Weight glutenin (*HMW-glu*) and the *Early-maturing* (*Em*) genes were also included in this study. Our results indicate that promoters work best in their homologous species and may or may not work in a heterologous species. This data demonstrates that for directing transgene expression in plants it is preferable to use promoters from the same species unless they have been adequately tested in the desired species.