

Modulation of the gibberellin content in transgenic turf-type bahiagrass for improved turf characteristics and reduced mowing requirements

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Introduction Bahiagrass is extensively used for utility turf along highways and for residential lawns in the southern USA and in the subtropical regions around the world. The objective of this experiment was to enhance turf quality of bahiagrass and reduce the mowing frequency by over-expression of a gibberellin catabolizing enzyme, Gibberellin 2-oxidase.

Materials and methods Gibberellin 2-oxidase8 cDNA was isolated from Arabidopsis using primers as suggested by Schomburg *et al.* (2003). Co-transfer of a constitutive *nptII* (Altpeter *et al.*, 2000) and GA-2 oxidase expression cassette, into seed derived callus cultures from turf-type bahiagrass (cv. 'Argentine') was followed by selection with paromomycin sulphate during callus subculture and, or regeneration (Altpeter and James, 2004). Transgenic plants were confirmed by NPTII ELISA (Agdia), PCR, RT-PCR and altered phenotype.

Results GA-2 oxidase cDNA was isolated from Arabidopsis, confirmed by sequencing and subcloned under the control of the constitutive 35S promoter. An efficient protocol for gene transfer to bahiagrass was established and supported the stable co-integration and constitutive expression of the selectable *nptII* gene and the Gibberellin 2-oxidase in bahiagrass. Transgenic plants over-expressing Gibberellin 2-oxidase showed an altered phenotype compared to wildtype bahiagrass (Figure 1 A,B).



Figure 1 A: Shorter internodes and darker green colour in transgenic bahiagrass line (left) compared to wild-type (right). B: Transgenic bahiagrass (right) with a dwarf phenotype compared to wild-type bahiagrass (left).

Conclusions Over-expression of Gibberellin 2-oxidase8 from Arabidopsis in bahiagrass resulted in dwarf phenotypes with darker green leaf colour. Transgenic plants produced normal roots and were established successfully in soil. Data correlating Gibberellin 2-oxidase over-expression in transgenic bahiagrass with physiological parameters will be collected.

References

- Altpeter, F., J. Xu, & S. Ahmed. (2000). Generation of large numbers of independently transformed fertile perennial ryegrass (*Lolium perenne* L.) plants of forage- and turf-type cultivars. *Mol. Breeding* 6:519-528.
- Altpeter, F & V. James (2004) Genetic transformation of turf-type bahiagrass (*Paspalum notatum* Flugge) by biolistic gene transfer. *Intern. Turfgrass Soc. Res. J.* (accepted for publication).
- Schomburg, F.M., C. M. Bizzell, D. J. Lee, J. A. D. Zeevaart & R. M. Amasino (2003) Overexpression of a novel class of Gibberellin 2-Oxidases Decreases Gibberellin Levels and Creates Dwarf Plants. *Plant Cell* 15: 151-163.