

# Overexpression of rice TLPD34 enhances dollar-spot resistance in transgenic bentgrass

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## Abstract

Creeping bentgrass (*Agrostis palustris* Huds.) is an important cool-season turfgrass and has been extensively used in golf course putting greens. To improve host resistance to fungal diseases, the rice thaumatin-like protein (TLPD34) gene was introduced into creeping bentgrass cv. 'Crenshaw' by using *Agrobacterium*-mediated transformation. Plant transformation was performed on mature seed-derived embryogenic calli by using *A. tumefaciens* strain LBA4404 in concert with a binary plasmid pUbiTLP, which carries the rice *tlpD34* gene and a *bar* selection marker. To screen the putative transgenic plants, bialaphos (2 mg l<sup>-1</sup>), and glufosinate–ammonium (0.2%, w/v) were applied at the tissue-culture stage and on plants in the greenhouse, respectively. In the glufosinate-tolerant bentgrass, genomic integration of *tlpD34* was first confirmed by PCR amplification and then by Southern analysis. The expression of TLPD34 in the transgenic lines was documented by Western blotting. The inheritance and expression of *tlpD34* transgene were further documented in the T<sub>1</sub> generation. To assess fungal disease resistance, a number of T<sub>0</sub> transgenic lines were screened against brown patch (*Rhizoctonia solani*) and dollar spot (*Sclerotinia homoeocarpa*). Field tests demonstrated that the transgenic lines displayed improved resistance to dollar spot. However, the same transgenic lines showed no improvement against brown patch under greenhouse conditions. The antifungal function of rice TLPD34 protein is additionally discussed.

**Keywords:** *Agrostis palustris*; *R. solani*; *S. homoeocarpa*; Thaumatin-like protein

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