(05-1-73)

Development of transgenic tall fescue (*Festuca arundinacea*) plants with enhanced tolerance to multiple abiotic stresses

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Objectives

Abiotic stress is one of the most important factor limiting the productivity of forage crops. To develop transgenic tall fescue plants with enhanced tolerance to abiotic stress, a multiple stress tolerance gene, *AtNDPK2,* was introduced into genome of tall fescue plants by *Agrobacterium*-mediated genetic transformation.

Materials and Methods

1. Plant cultivars: Tall fescue (*Festuca arundinacea*), cv. K-31, Cajun
2. *Agrobacterium* strain: EHA105
3. Expression vectors:
   CaMV35S::*AtNDPK2* or SWPA2::*AtNDPK2* in pCAMBIA1300
4. Transformation: *Agrobacterium*-mediated transformation
5. Stress treatments: Leaf squares from transgenic tall fescue plants were subjected to abiotic stresses such as methyl viologen (MV) or hydrogen peroxide (H_2O_2), and cellular damages are measured.

Results and Discussion

Transgenic tall fescue plants expressing *AtNDPK2* were developed. PCR and Southern blot analyses revealed that transgenes were successfully integrated into genome of regenerated transgenic plants. Leaf squares from transgenic plants were subjected to oxidative stresses such as methyl viologen (MV) or H_2O_2, and cellular damages are measured. Transgenic plants showed enhanced tolerance to MV- or H_2O_2 -mediated oxidative stress. These results suggest that the *AtNDPK2* plays an important role in protecting the tall fescue plant against damages caused by abiotic stresses.

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