



Methodology

Characterization of a rice germin-like protein gene promoter

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ABSTRACT. Germin and germin-like proteins (GLPs) are water-soluble extracellular proteins that are expressed in response to specific environmental and developmental signals. Although some enzymatic activities have also been associated with germin/GLPs, their role in overall metabolism is not fully understood. However, insight into their function may be gained by analysis of their promoter. The present study was designed to analyze the functional importance of a root-expressed *Oryza sativa* GLP gene promoter (*OsRGLP2*). One of the most striking properties of the *OsRGLP2* promoter, which we report for the first time, is its wound-inducible activity. In fully grown plants, tissue-specific *OsRGLP2* promoter activity was observed in the inner and outer phloem of the mid rib, at the petiole stem junction, in cortical cells adjacent to the phloem, in the epidermal layer cells and epidermal hairs of the stem, in young xylem cells, and in petal veins, whereas in sepals it was diffused

and found only in the younger parts. No activity was observed in the mid rib, blade, or apex of mature and young leaves. The *OsRGLP2* promoter was also found to be salt and dehydration responsive, whereas temperature had almost no effect on its activity. Of note, 6-benzylaminopurine showed some effect on promoter activity, whereas indole-3-acetic acid had no effect. Microscopic analysis showed sharp glucuronidase gene expression in leaf veins under salt stress, which was diffused in all other treatments. The results of this study indicate that the *OsRGLP2* is a robust promoter capable of driving expression of downstream genes under certain stress conditions, including wounding, salt and dehydration.

Key words: Germin-like protein gene; Wounding; Promoter; *Oryza sativa*; Tobacco transformation; GUS expression