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SIZ1-mediated SUMOylation during phosphate homeostasis in plants: looking beyond the tip of the iceberg

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ABSTRACT

Availability of phosphate (Pi) is often limited in rhizospheres in different agroclimatic zones and adversely affects growth and development of plants. To circumvent this impasse, there is an urgent need and global consensus to develop Pi use efficient crops. To achieve this goal, it is essential to identify the molecular entities that exert regulatory influences on the sensing and signaling cascade governing Pi homeostasis. *SIZ1* encodes a small ubiquitin-like modifier (SUMO E3) ligase, and plays a pivotal role in the post-translational SUMOylation of proteins. In this review, we discuss the reverse genetics approach conventionally used for providing circumstantial evidence towards the regulatory influences of *SIZ1* on several morphophysiological and molecular traits that govern Pi homeostasis in taxonomically diverse *Arabidopsis thaliana* (Arabidopsis) and *Oryza sativa* (rice) model species. However, the efforts have been rather modest in identifying SUMO protein targets that play key roles in the maintenance of Pi homeostasis in these model plants contrary to the plethora of them now known

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